MODELS | SJ 8831E SJ 8841E

Service Manual

DC Electric Full-Size Rough Terrain

Part No. 155154AB February 2014

SKYJACK

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DC Electric Full-Size Rough Terrain Service Manual

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The Safety Alert Symbol identifies important safety messages on aerial platforms, safety signs in manuals or elsewhere. When you see this symbol, be alert to the possibility of personal injury or death. Follow the instructions in the safety message.

This Safety Alert Symbol means attention!

Become alert! Your safety is involved.

DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

IMPORTANT

IMPORTANT indicates a procedure) essential for safe operation and which, if not followed, may result in a malfunction or damage to the aerial platform.

Section 1
SCHEDULE MAINTENANCE

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SKYJACK is continuously improving and expanding product features on its equipment, therefore, specifications and dimensions are subject to change without notice.

Aerial Platform Definition
A mobile device that has an adjustable position platform supported from ground level by a structure.

Purpose of Equipment
The SKYJACK DC Electric Full-size Rough Terrain (Models 8831E & 8841E) aerial platforms are designed to transport and raise personnel, tools and materials to overhead work areas.

Use of Equipment
The aerial platform is a highly maneuverable, mobile work station. Lifting and driving must be on a flat, level, compacted surface. It can be driven over uneven terrain only when the platform is fully lowered.

Manuals
Operating
The operating manual is considered a fundamental part of the aerial platform. It is a very important way to communicate necessary safety information to users and operators. A complete and legible copy of this manual must be kept in the provided weather-resistant storage compartment on the aerial platform at all times.

Service & Maintenance
The purpose of this is to provide the customer with the servicing and maintenance procedures essential for the promotion of proper machine operation for its intended purpose.

All information in this manual should be read and understood before any attempt is made to service the machine. The updated copy of the manuals are found on the company's website: www.skyjack.com.

Operator
The operator must read and completely understand both this operating manual and the safety panel label located on the platform and all other warnings in this manual and on the aerial platform. Compare the labels on the aerial platform with the labels found within this manual. If any labels are damaged or missing, replace them immediately.

Service Policy and Warranty
SKYJACK warrants each new SJRT series work platform to be free of defective parts and workmanship for the first 24 months. Any defective part will be replaced or repaired by your local SKYJACK dealer at no charge for parts or labor. Contact the SKYJACK Service Department for warranty statement extensions or exclusions.

Optional Accessories
The SKYJACK aerial platform is designed to accept a variety of optional accessories. These are listed under "Standard and Optional Features" in Table 2.1 of the operating manual. Operating instructions for these options (if equipped) are located in section 2 of the operating manual.

For non-standard components or systems, contact the SKYJACK Service Department at

☎ : 44-1691-676-235
🖷 : 44-1691-676-238

Include the model and serial number for each applicable aerial platform.

Scope of this Manual

a. This manual applies to the CE version of DC Electric Full-size Rough Terrain aerial platform models listed on Table 2.1.

- Equipment identified with "CE" meets the requirements for the European countries, i.e., Machinery Directive 2006/42/EC and EMC Directive 2004/108/EEC and the corresponding EN standards.

b. Operators are required to conform to national, state or territorial/provincial and local health and safety regulations applicable to the operation of this aerial platform.

WARNING

Failure to comply with your required responsibilities in the use and operation of the aerial platform could result in death or serious injury!

Operator Safety Reminders

A study conducted by St. Paul Travelers showed that most accidents are caused by the failure of the operator to follow simple and fundamental safety rules and precautions.

You, as a careful operator, are the best insurance against an accidenvt. Therefore, proper usage of this aerial platform is mandatory. The following pages of this manual should be read and understood completely before operating the aerial platform.

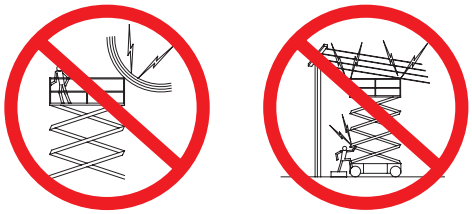
Common sense dictates the use of protective clothing when working on or near machinery. Use appropriate safety devices to protect your eyes, ears, hands, feet and body.

Any modifications from the original design are strictly forbidden without written permission from SKYJACK.

Electrocution Hazard

This aerial platform is not electrically insulated. Maintain a Minimum Safe Approach Distance (MSAD) from energized power lines and parts as listed below. The operator must allow for the platform to sway, rock or sag. This aerial platform does not provide protection from contact with or proximity to an electrically charged conductor.

DO NOT USE AERIAL PLATFORM AS A GROUND FOR WELDING.
DO NOT OPERATE AERIAL PLATFORM DURING LIGHTNING OR STORMS.



DANGER

Avoid Power Lines

Minimum Safe Approach Distance

CE Guidance Note

"Avoidance of danger from overhead lines"

Adhere strictly to the governmental rulings and regulations applicable in your country.

FAILURE TO AVOID THIS HAZARD WILL RESULT IN DEATH OR SERIOUS INJURY!

Safety Precautions

Know and understand the safety precautions before going on to next section.

WARNING

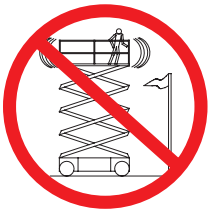
Failure to heed the following safety precautions could result in tip over, falling, crushing, or other hazards leading to death or serious injury.

- **KNOW** all national, state/provincial and local rules which apply to your aerial platform and jobsite.
- **TURN** the (emergency) main power disconnect switch off when leaving the aerial platform unattended. Remove the key to prevent unauthorized use of the aerial platform.
- **WEAR** all the protective clothing and personal safety devices issued to you or called for by job conditions.
- **DO NOT** wear loose clothing, dangling neckties, scarves, rings, wristwatches or other jewelry while operating this aerial platform.

- **AVOID** entanglement with ropes, cords or hoses.

- **AVOID** falling. Stay within the boundaries of the guardrails.

- **DO NOT** raise the aerial platform in windy or gusty conditions.

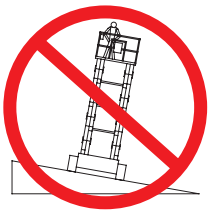


- **DO NOT** increase the lateral surface area of the platform. Increasing the area exposed to the wind will decrease aerial platform stability.

- **DO NOT** drive or elevate the aerial platform if it is not on a firm level surface. Do not drive elevated near depressions or holes of any type, loading docks, debris, drop-offs and surfaces that may affect the stability of the aerial platform.

- **If operation in areas with holes or drop-offs is absolutely necessary**, elevated driving shall not be allowed. Position the aerial platform horizontally only with the platform fully lowered. After ensuring that all 4 wheels or outriggers (if equipped) have contact with level firm surface, the aerial platform can be elevated. After elevation, the drive function must not be activated.

- **Elevated driving** must only be done on a firm level surface.



- **DO NOT** ascend or descend a grade when elevated. When fully lowered, ascending or descending, only grades up to rated maximum listed in Table 2.3 are permissible.

Safety Precautions (Continued)

Know and understand the safety precautions before going on to next section.

- **DO NOT** operate on surfaces not capable of holding the weight of the aerial platform including the rated load, e.g. covers, drains, and trenches.
- **DO NOT** operate an aerial platform that has ladders, scaffolding or other devices mounted on it to increase its size or work height. It is prohibited.

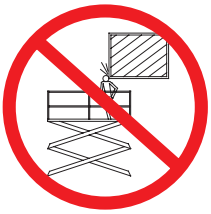
- **DO NOT** exert side forces on aerial platform while elevated.

- **DO NOT** use the aerial platform as a crane. It is prohibited.

- **DO NOT** sit, stand or climb on the guardrails. It is prohibited.

- **DO NOT** climb on scissor arm assembly. It is prohibited.

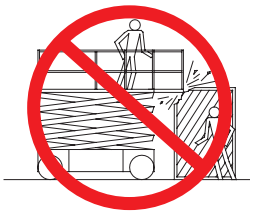
- **BE AWARE** of overhead obstructions or other possible hazards around the aerial platform when driving or lifting.



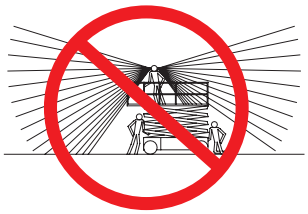
- **DO NOT** raise the platform while the aerial platform is on a truck, fork lift or other device or vehicle.

- **BE AWARE** of crushing hazards. Keep all body parts inside platform guardrail.

- **DO NOT** lower the platform unless the area below is clear of personnel and obstructions.



- **ENSURE** that there are no personnel or obstructions in the path of travel, including blind spots.



- **BE AWARE** of blind spots when operating the aerial platform.
- **STUNT** driving and horseplay are prohibited.
- **ENSURE ALL** tires are in good condition and lug nuts are properly tightened.
- **DO NOT** alter or disable limit switches or other safety devices.
- **DO NOT** use the aerial platform without guardrails, locking pins and the entry gate/chain/bar in place.

Safety Precautions (Continued)

Know and understand the safety precautions before going on to next section.

- **DO NOT** exceed the rated capacity of the aerial platform. Do make sure the load is evenly distributed on the platform.
- **DO NOT** attempt to free a snagged platform with lower controls until personnel are removed from the platform.
- **DO NOT** position the aerial platform against another object to steady the platform.
- **DO NOT** place materials on the guardrails or materials that exceed the confines of the guardrails unless approved by Skyjack.

WARNING

Entering and exiting the aerial platform should only be done using the three points of contact.

- Use only equipped access openings.
- Enter and exit only when the aerial platform is in the fully retracted position.

- Do use three points of contact to enter and exit the platform. Enter and exit the platform from the ground only. Face the aerial platform when entering or exiting the platform.
- Three points of contact means that two hands and one foot or one hand and two feet are in contact with the aerial platform or the ground at all times during entering and exiting.

WARNING

An operator should not use any aerial platform that:

- does not appear to be working properly.
- has been damaged or appears to have worn or missing parts.
- has alterations or modifications not approved by the manufacturer.
- has safety devices which have been altered or disabled.
- has been tagged or blocked out for non-use or repair.

Failure to avoid these hazards could result in death or serious injury.

Jobsite Inspection

- Do not use in hazardous locations.
- Perform a thorough jobsite inspection prior to operating the aerial platform, to identify potential hazards in your work area.
- Be aware of moving equipment in the area. Take appropriate actions to avoid collision.

Maintenance and Inspection Schedule

The actual operating environment of the work platform governs the use of the maintenance schedule. The inspection points covered in Table 1.2. Maintenance and Inspection Checklist, indicates the areas of the aerial platform to be maintained or inspected and at what intervals the maintenance and inspections are to be performed.

Owner's Annual Inspection Record

It is the responsibility of the owner to arrange quarterly and annual inspections of the aerial platform. Table 1.1. Owner's Annual Inspection Record is to be used for recording the date of the inspection, owner's name, and the person responsible for the inspection of the work platform.

Replacement Parts

Use only original replacement parts. Parts such as batteries, wheels, railings, etc. with weight and dimensions different from original parts will affect stability of the aerial platform and must not be used without manufacturer's consent.

All replacement tires must be of the same size and load rating as originally supplied tires; to maintain safety and stability of aerial platform.

Consult SKYJACK's Service Department for optional tires specifications and installation.

WARNING

Any unit that is damaged or not operating properly must be immediately tagged and removed from service until proper repairs are completed.

Maintenance and Service Safety Tips

Maintenance and repair should only be performed by personnel who are trained and qualified to service this aerial platform.

All maintenance and service procedures should be performed in a well lighted and well ventilated area.

Anyone operating or servicing this aerial platform must read and completely understand all operating instructions and safety hazards in this manual and operating manual.

All tools, supports and lifting equipment to be used must be of proper rated load and in good working order before any service work begins. Work area should be kept clean and free of debris to avoid contaminating components while servicing.

All service personnel must be familiar with employer and governmental regulations that apply to servicing this type of equipment.

Keep sparks and flames away from all flammable or combustible materials.

Properly dispose of all waste material such as lubricants, rags, and old parts according to the relative law provisions obtaining in the country.

Before attempting any repair work, turn Battery Disconnect Switch to the "OFF" position.

Preventive maintenance is the easiest and least expensive type of maintenance.

Hydraulic System & Component Maintenance and Repair

The following points should be kept in mind when working on the hydraulic system or any component:

1. Any structure has limits of strength and durability. To prevent failure of structural parts of hydraulic components, relief valves which limit pressure to safe operating values are included in the hydraulic circuits.

2. Tolerance of working parts in the hydraulic system is very close. Even small amounts of dirt or foreign materials in the system can cause wear or damage to components, as well as general faulty operation of the hydraulic system. Every precaution must be taken to assure absolute cleanliness of the hydraulic oil.

3. Whenever there is a hydraulic system failure which gives reason to believe that there are metal particles or foreign materials in the system, drain and flush the entire system and replace the filter cartridges. A complete change of oil must be made under these circumstances.

4. Whenever the hydraulic system is drained, check the magnets in the hydraulic reservoir for metal particles. If metal particles are present, flush the entire system and add a new change of oil. The presence of metal particles also may indicate the possibility of imminent component failure. A very small amount of fine particles is normal.

5. All containers and funnels used in handling hydraulic oil must be absolutely clean. Use a funnel when necessary for filling the hydraulic oil reservoir, and fill the reservoir only through the filter opening. The use of cloth to strain the oil should be avoided to prevent lint from getting into the system.

6. When removing any hydraulic component, be sure to cap and tag all hydraulic lines involved. Also, plug the ports of the removed components.

NOTE

Samples of hydraulic oil should be drawn from the reservoir and tested annually. These samples should be taken when the oil is warmed through normal operation of the system. The sample should be analyzed by a qualified lubrication specialist to determine if it is suitable for continued use.

Oil change intervals will depend on the care used in keeping the oil clean, and the operating conditions. Dirt and/or moisture cotamination will dictate that the oil should be changed more often. Under normal use and operating conditions, the hydraulic oil should be changed every two years. Refer to Table 1.2 of this manual.

7. All hydraulic components must be disassembled in spotlessly clean surroundings. During disassembly, pay particular attention to the identification of parts to assure proper reassembly. Clean all metal parts in a clean mineral oil solvent. Be sure to thoroughly clean all internal passages. After the parts have been dried thoroughly, lay them on a clean, lint-free surface for inspection.

8. Replace all O-rings and seals when overhauling any component. Lubricate all parts with clean hydraulic oil before reassembly. Use small amounts of petroleum jelly to hold O-rings in place during assembly.

9. Be sure to replace any lost hydraulic oil when completing the installation of the repaired component, and bleed any air from the system when required.

10. All hydraulic connections must be kept tight. A loose connection in a pressure line will permit the oil to leak out or air to be drawn into the system. Air in the system can cause damage to the components and noisy or erratic system operation.

Maintenance Hints

Three simple maintenance procedures have the greatest effect on the hydraulic system performance, efficiency and life. Yet, the very simplicity of them may be the reason they are so often overlooked. What are they? Simply these:

1. Change filters annually. The filters will need to be changed more often depending on the operating conditions. Dirty, dusty, high moisture environments may cause the hydraulic system to be contaminated more quickly.
2. Maintain a sufficient quantity of clean hydraulic oil of the proper type and viscosity in the hydraulic reservoir.
3. Keep all connections tight.

About this Section

This section contains the maintenance and inspection schedule that is to be performed.

References are made to the procedures in section 5 that outline detailed step-by-step instructions for checks and replacements.

Service Bulletins

Before performing any scheduled maintenance inspection procedure, refer to service bulletins found in our web site: www.skyjack.com for updates related to service and maintenance of this aerial platform.

Maintenance and Inspection

Death or injury can result if the aerial platform is not kept in good working order. Inspection and maintenance should be performed by competent personnel who are trained and qualified on mantenance of this aerial platform.

WARNING

Failure to perform each procedure as presented and scheduled may cause death, serious injury or substantial damage.

NOTE

Preventive maintenance is the easiest and least expensive type of maintenance.

- Unless otherwise specified, perform each maintenance procedure with the aerial platform in the following configuration:
  - Aerial platform parked on a flat and level surface
  - Disconnect the battery by turning the main power disconnect switch to the “OFF” position.
- Repair any damaged or malfunction components before operating aerial platform.
- Keep records on all inspections.

Maintenance Instructions

This manual consists of four schedules to be done for maintaining on an aerial platform. Inspection schedule frequency is shown below:

Inspection Schedule

Daily	A
Frequently	A + B
Annually	A + B + C
Bi-annually	A + B + C + D

- Make copies of the maintenance and inspection checklist to be used for each inspection.
- Check the schedule on the checklist for the type of inspection to be performed.
- Place a check in the appropriate box after each inspection procedure is completed.
- Use the maintenance and inspection checklist and step-by-step procedures in section 5 to perform these inspections.
- If any inspection receives a fail, tag and remove the aerial platform from service.
- If any aerial platform component(s) has been repaired, an inspection must be performed again before removing the tag. Place a check in the repair column.

Legend

P = Pass
F = Fail
R = Repaired

Table 1.1 Owner's Annual Inspection Record

Model Number: _____					**Serial Number:** _____					
Inspection Date										
Recording Year	New	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Owner's Name	Skyjack Inc.									
Inspected By	Skyjack Inc.									

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As described earlier in this section, this decal is located on the scissor assembly. It must be completed after an annual inspection has been completed. Do not use the aerial platform if an inspection has not been recorded in the last 6 months.

Table 1.2 MAINTENANCE AND INSPECTION CHECKLIST

Serial Number: _____

Model: _____

Hourmeter Reading: _____ Name (Printed): _____

Date: _____

Time: _____ Signature: _____

Each item shall be inspected using the the appropriate section of the Skyjack service manual.
As each item is inspected, write the apropriate grade in the box.

P - PASS
F - FAIL
R - REPAIRED

INSPECTION FREQUENCY

- ❑ DAILY
- ❑ FREQUENTLY
- ❑ ANNUALLY
- ❑ BI-ANNUALLY

Inspection Schedule	
Daily	A
Frequently*†	A + B
Annually†	A + B + C
Bi-annually†	A + B + C + D

Schedule		P	F	R
Schedule Maintenance Inspections				
Labels	A			
Limit Switches	A, B			
Battery Compartment				
Battery Tray	A, B			
Battery	A, B			
Battery Connectors	A, B			
Fuse Box	A, B			
Hydraulic/Electrical Compartment				
Electrical Panel	A, B			
Manifolds	A, B, C			
Base Control Switches	A, B			
Emergency Lowering Access Rod	A, B			
Battery Charger/Hydraulic Compartment				
Hydraulic Tank	A, B			
Hydraulic Oil	A, B			
Battery Charger	A, B			
Platform Assembly				
Lanyard Attachment Anchors	A			
AC Outlet on Platform	A, B			
Platform Control Console	A, B			
Powered Extension Control Console (If Equipped)	A, B			
Lift Mechanism				
Scissor Guards (If Equipped)	A, B			
Sliders	A, B			
Maintenance Support	A, B			
Scissor Assembly	A, B			
Scissor Bumpers	A, B			
Lift Cylinder(s)	A, B			

Schedule		P	F	R
Base				
Base Weldment	A, B			
Wheel/Tire Assembly	A, B			
Axles	A, B			
Steer Cylinder Assembly	A, B			
Tie Rod	A, B			
Disc Brake	A, B			
Drive Motor	A, B			
Ladder	A, B			
Outriggers (If Equipped)	A, B			
Manual	A, B			
Function Tests				
Test Battery Connectors	A, B			
Base Control Console				
Test Base Emergency Stop	A, B			
Test Off/Platform/Base Switch	A, B			
Test Lower/Neutral/Raise Switch	A, B			
Test Emergnency Lowering	A, B			
Platform Control Console				
Test Platform Emergency Stop	A, B			
Test Enable Trigger Switch	A, B			
Test Platform Raising/Lowering	A, B			
Test Lowering Warning - CE	A, B			
Test Steering	A, B			
Test Driving	A, B			
Test Brakes	A, B			
Test Elevated Drive Speed	A, B			
Test Horn	A, B			

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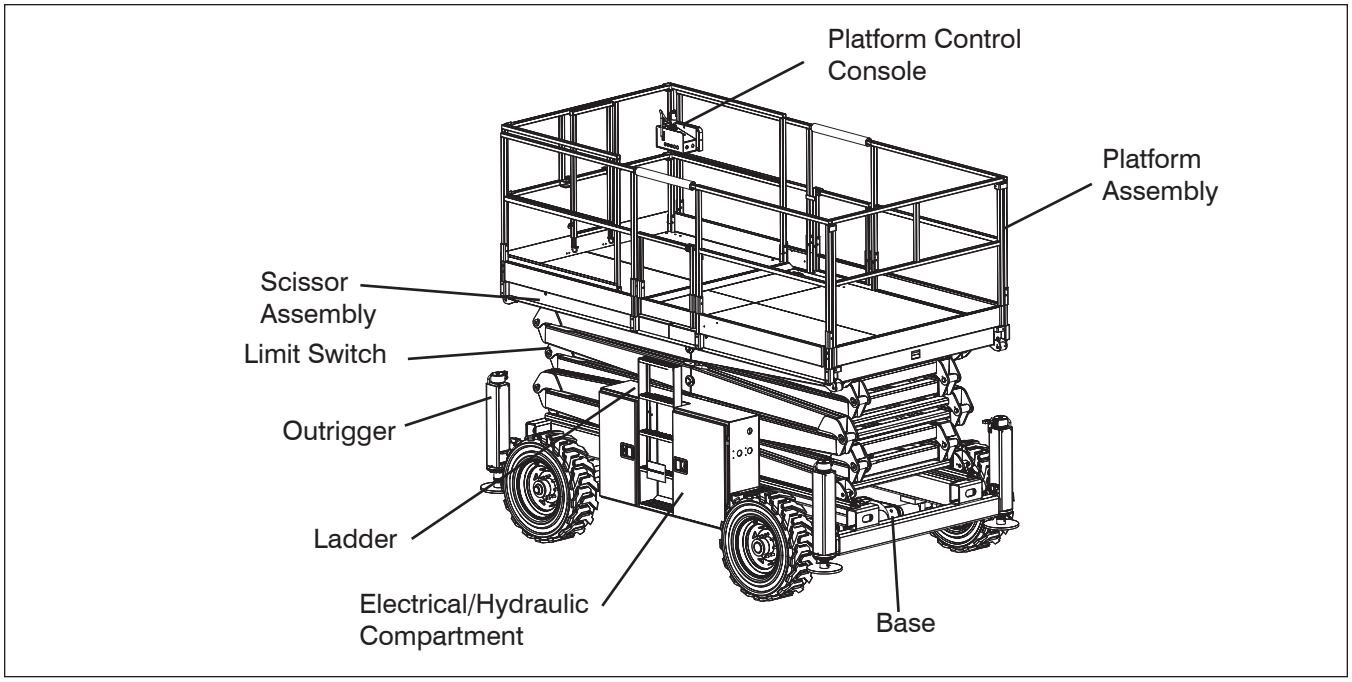
A - Perform Visual and Daily Maintenance Inspections & Functions Test. Refer to Section 2.7 of the Operating Manual.
B - Perform Scheduled Maintenance Inspection every three months or 150 hrs. Refer to Section 1.0 of this manual.
C - Perform Scheduled Maintenance Inspection every year. Refer to Section 1.0 of this manual.
D - Perform Scheduled Maintenance Inspection every 2 years. Refer to Section 1.0 of this manual.
***** Perform scheduled inspection every three months or 150 hours.
† Refer to Skyjack's webiste @ www.skyjack.com for latest service bulletins prior to performing quarterly or yearly inspection.

Note: Make a copy of this page or visit the Skyjack web site:www.skyjack.com for a printable copy.



1.1 Scheduled Maintenance Inspections

Begin the scheduled maintenance inspections by checking each item in sequence for the conditions listed in this section.

WARNING

To avoid injury, do not operate an aerial platform until all malfunctions have been corrected.

WARNING

To avoid possible injury, ensure aerial platform power is off during your visual and daily maintenance inspections.

Electrical

Maintaining the electrical components is essential to good performance and service life of the aerial platform.

Inspect the following areas for chafed, corroded and loose wires:

- base to platform cables and wiring harness
- engine compartment electrical panel
- engine wiring harness
- hydraulic/electrical wiring harnesses

Hydraulic

Maintaining the hydraulic components is essential to good performance and service life of the aerial platform.

Perform a visual inspection around the following areas:

- hydraulic tank filter, fittings, hoses, emergency power unit (if equipped) and base surfaces
- engine compartment fittings, hoses, main pump, and filter
- all hydraulic cylinders
- all hydraulic manifolds
- the underside of the base
- ground area under the aerial platform
- outriggers

1.1-1 Labels

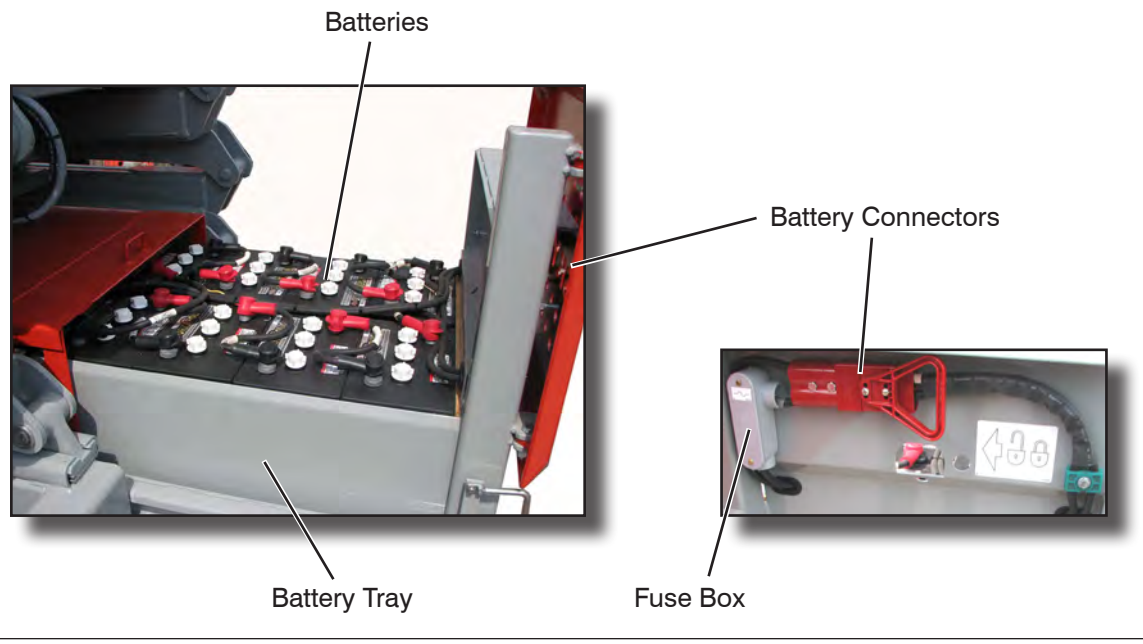
Refer to the labels section in this manual and determine that all labels are in place and are legible.

1.1-2 Limit Switches

Detecting limit switch malfunction is essential to safe aerial platform operation. Ensure limit switches are properly secured with no signs of visible damage and movement is not obstructed.

Visually inspect all limit switch located inside the scissor arms and the outrigger assemblies for the following:

- broken or missing actuator arm
- missing fasteners
- loose wiring



1.1-3 Battery Compartment

- **Battery Tray**
  - Ensure tray is properly secured and there is no visible damage.
  - Ensure compartment latch is secure and in proper working order.
- **Battery**
  Proper battery condition is essential to good performance and operational safety. Improper fluid levels or damaged cables and connections can result in component damage and hazardous conditions.

WARNING

Explosion hazard. Keep flames and sparks away. Do not smoke near batteries.

WARNING

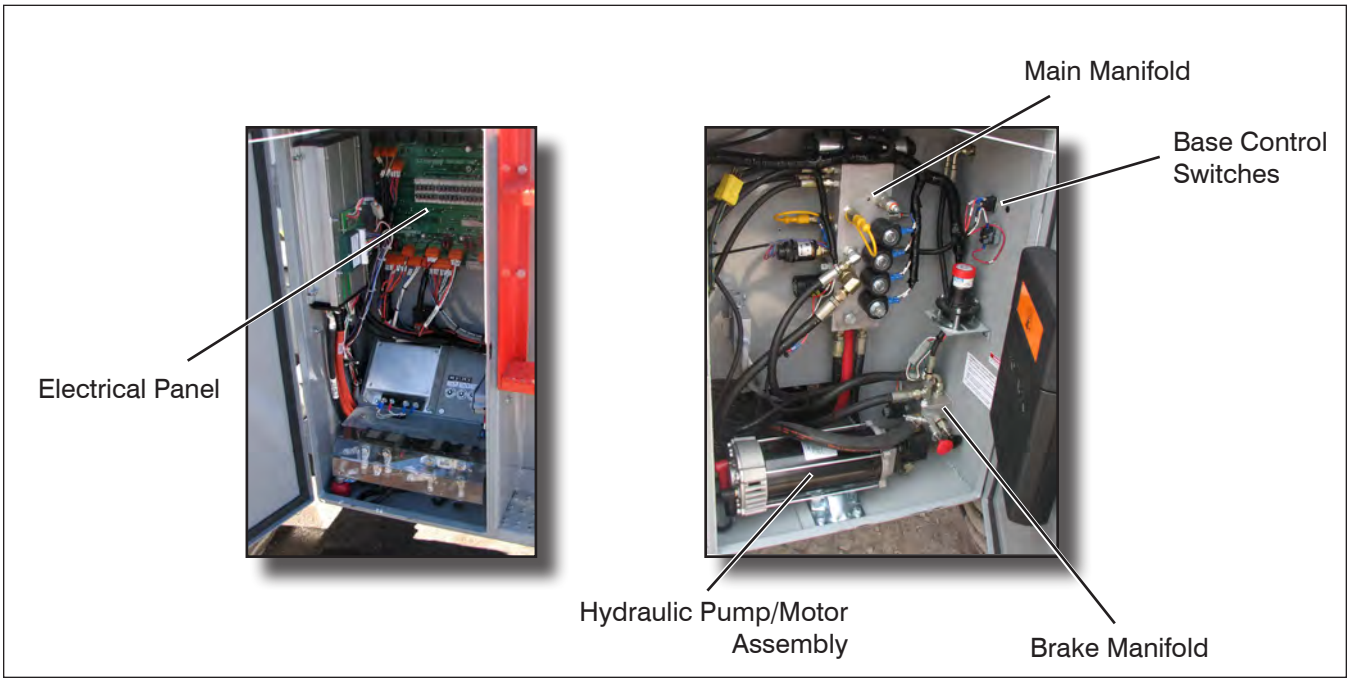
Battery acid is extremely corrosive - Wear proper eye and facial protection as well as appropriate protective clothing. If contact occurs, immediately flush with cold water and seek medical attention.

1. Check battery case for damage.
2. Clean battery terminals and cable ends thoroughly with a terminal cleaning tool or wire brush.
3. Ensure all battery connections are tight.
4. If applicable, check battery fluid level. If plates are not covered by at least 13 mm of solution, add distilled or demineralized water.
5. Replace battery if damaged or incapable of holding a lasting charge.

WARNING

Use original or manufacturer-approved parts and components for the aerial platform.

- **Battery Connectors**
  - Ensure battery connectors are properly secured and there is no visible damage.
- **Fuse Box**
  - Ensure fuse box is properly secured and there is no visible damage.



1.1-4 Hydraulic/Electrical Compartment

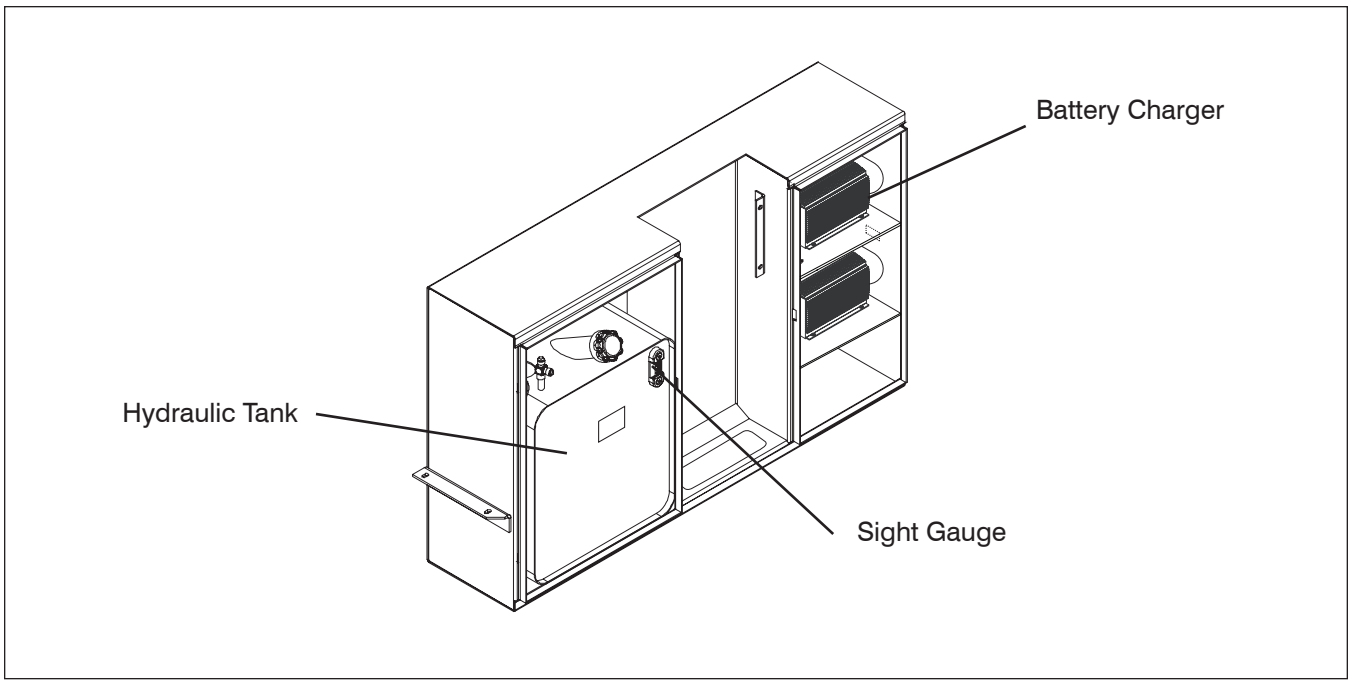
- Ensure all compartment latches are secure and in proper working order.

- **Electrical Panel**
  - Ensure panel is properly secured and there is no visible damage.
  - Ensure there are no loose wires or missing fasteners.

- **Manifolds**
  - Ensure all fittings and hoses are properly tightened and there is no evidence of hydraulic leakage.
  - Ensure there are no loose wires or missing fasteners.

- **Base Control Switches**
  - Ensure there are no signs of visible damage and all switches are in their neutral positions.

- **Emergency Lowering Access Rod**
  - Ensure rod is properly secured and there is no visible damage.



1.1-5 Battery Charger/Hydraulic Compartment

- Ensure all compartment latches are secure and in proper working order.

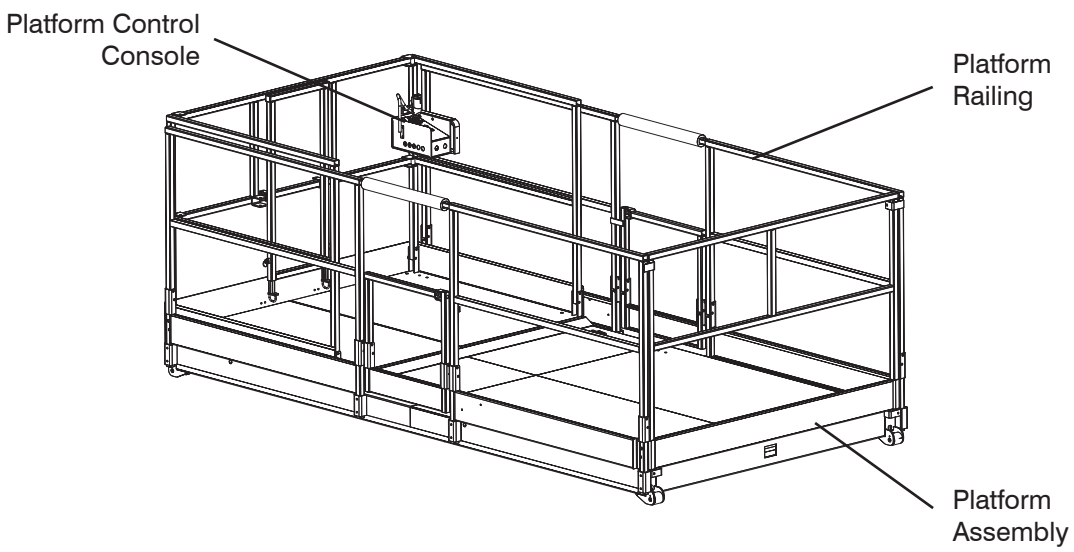
- **Hydraulic Tank**
  - Ensure hydraulic filler cap is secure.
  - Ensure tank shows no visible damage and no evidence of hydraulic leakage.

- **Hydraulic Oil**
  - Ensure platform is fully lowered, and outriggers retracted, and then visually inspect the sight gauge located on the side of the hydraulic oil tank. Check oil level against label that indicates minimum and maximum oil levels.

C - Annual Inspection

- For hydraulic oil replacement procedure, refer to section 5.

- **Battery Chargers**
  - Ensure chargers are secure and shows no visible damage.



1.1-6 Platform Assembly

WARNING

Ensure that you maintain three points of contact to mount/dismount platform.

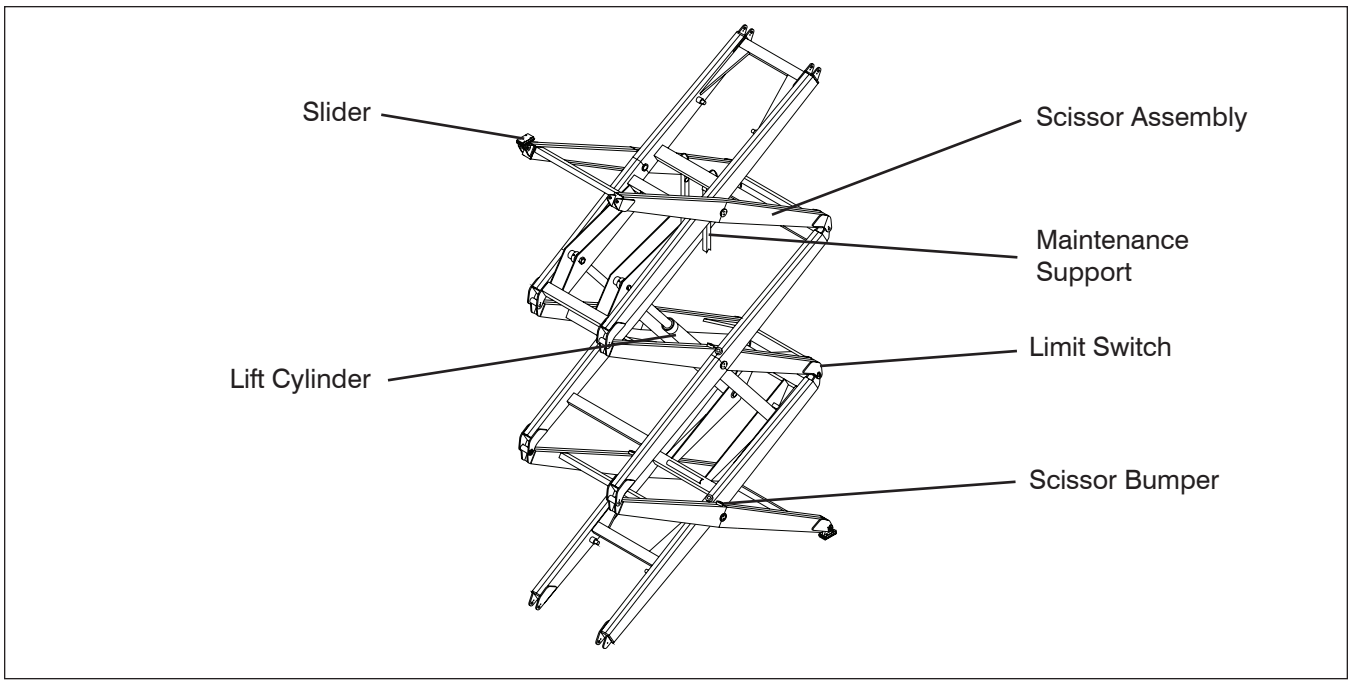
1. Use the ladder of aerial platform to access platform.
2. Close the gate.
   - Ensure there are no loose or missing parts and there is no visible damage.
   - Ensure all fasteners are securely in place.
   - Ensure all railings are properly positioned and secured.
   - Ensure gate is in good working order.

- **Lanyard Attachment Anchors**
  - Ensure attachment rings are secure and have no visible damage.
- **AC Outlet on Platform**
  - Ensure outlet has no visible damage and free from dirt or obstructions.
- **Platform Control Console**
  - Ensure all switches and controller are returned to neutral and are properly secured.
  - Ensure there are no loose or missing parts and there is no visible damage.
- **Powered Extension Control Console (If Equipped)**
  - Ensure all switches are returned to neutral and are properly secured.
  - Ensure there are no loose or missing parts and there is no visible damage.

WARNING

Ensure that you maintain three points of contact to mount/dismount platform.

3. Use the ladder to dismount from platform.



1.1-7 Lifting Mechanism

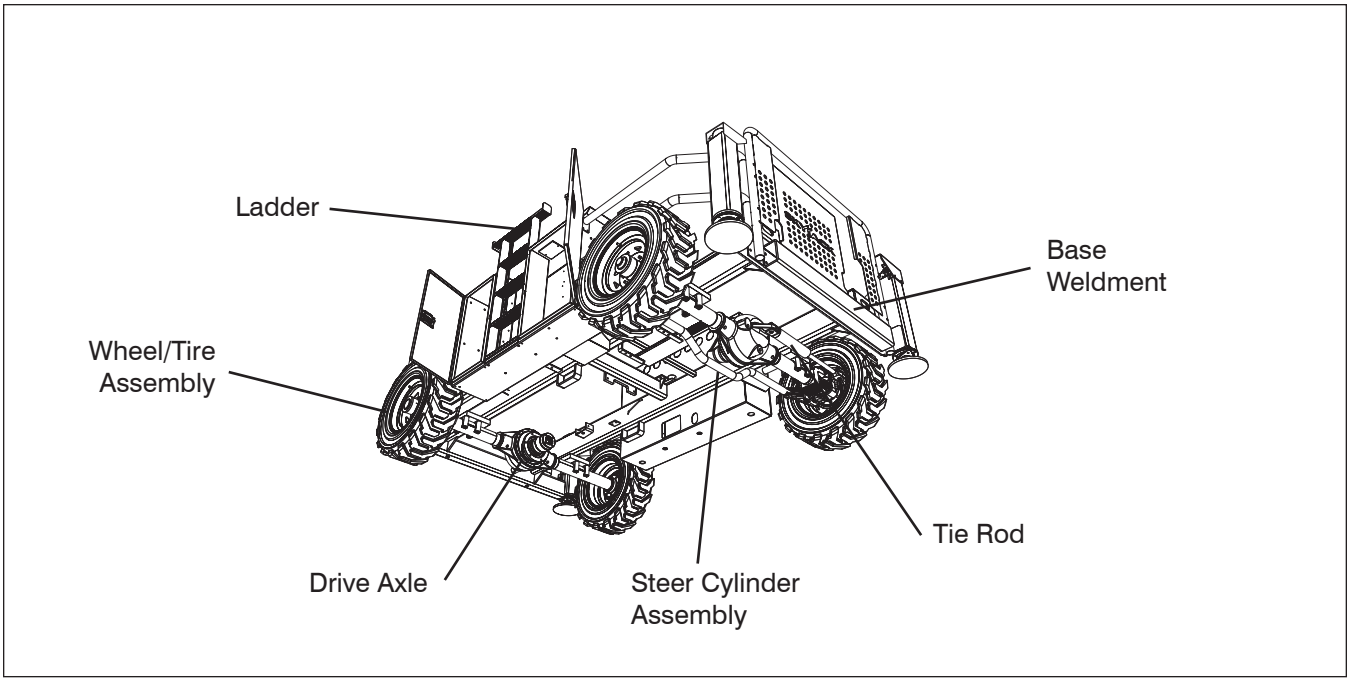
- **Scissor Guards**
  - Ensure there are no loose or missing parts and there is no visible damage.
- **Sliders**
  - Ensure sliders are secure and there is no visible damage.
  - Ensure sliders' path of travel are free from dirt and obstructions.

1. Raise the platform until there is adequate clearance to swing down the maintenance support.

- **Maintenance Support**
  - Ensure maintenance support is properly secured and shows no visible damage.
- **Scissor Assembly**
  - Ensure scissor assembly shows no visible damage and no signs of deformation in weldments.
  - Ensure all pins are properly secured.
  - Ensure cables and wires are properly routed and shows no signs of wear and/or physical damage.
- **Scissor Bumpers**
  - Ensure bumpers are secure and shows no sign of visible damage.
- **Lift Cylinder(s)**
  - Ensure each lift cylinder is properly secured, there are no loose or missing parts and there is no evidence of damage.
  - Ensure all fittings and hoses are properly tightened and there is no evidence of hydraulic leakage.

2. Raise the platform until there is adequate clearance to swing up the maintenance support into storage bracket.

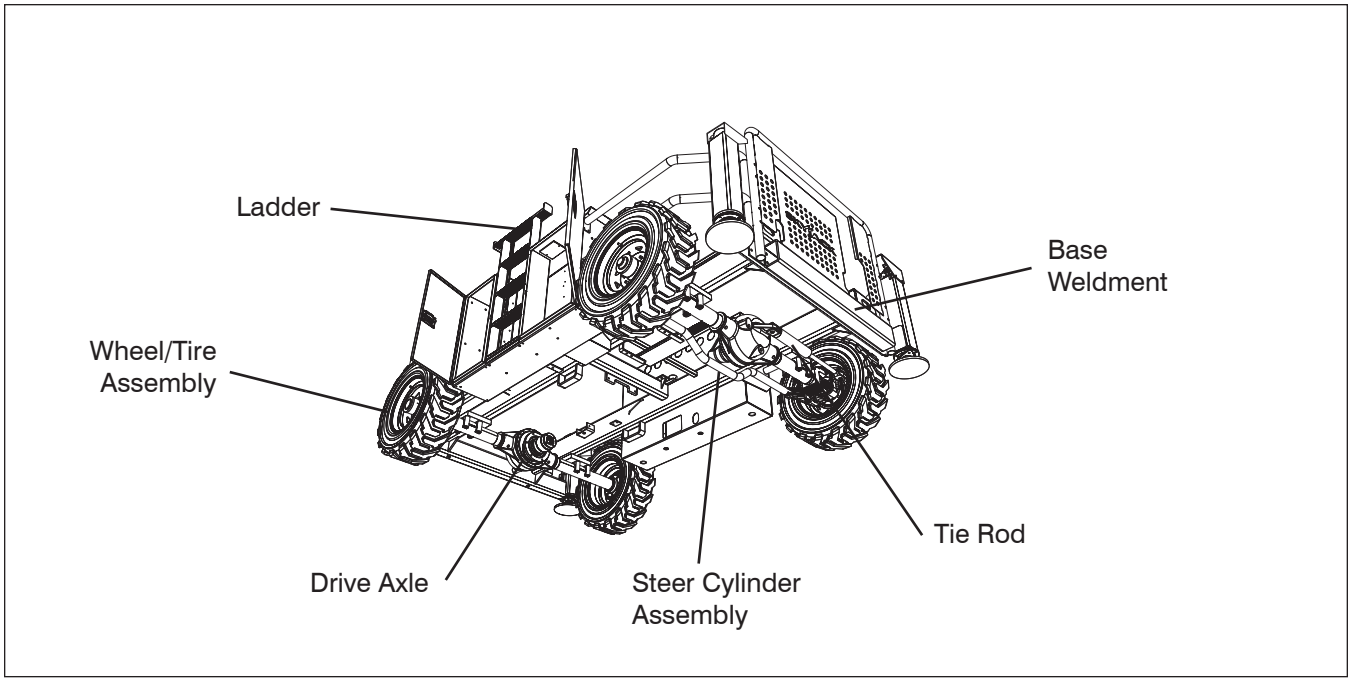
3. Fully lower the platform.



1.1-8 Base

- **Base Weldment**
  - Ensure there are no visible cracks in welds or structure and there are no signs of deformation.
- **Wheel/Tire Assembly**
  The aerial platform is either equipped with foam-filled tires. Tire and/or wheel failure could result in an aerial platform tipover. Component damage may also result if problems are not discovered and repaired in a timely fashion.
  - Check all tire treads and sidewalls for cuts, cracks, punctures and unusual wear.
  - Check each wheel for damage and cracked welds.
  - Check each lug nut for proper torque to ensure none are loose.

  Refer to Table 2.4 for wheel/tire specifications.
- **Axles**
  - Ensure axles are properly secured, there are no loose or missing parts, all fittings and hoses are properly tightened and there is no evidence of hydraulic leakage.
- **Steer Cylinder Assembly**
  - Ensure steer cylinder assembly is properly secured, there are no loose or missing parts, all fittings and hoses are properly tightened and there is no evidence of hydraulic leakage.
- **Tie Rod**
  - Ensure there are no loose or missing parts, tie rod end studs are locked and there is no visible damage.

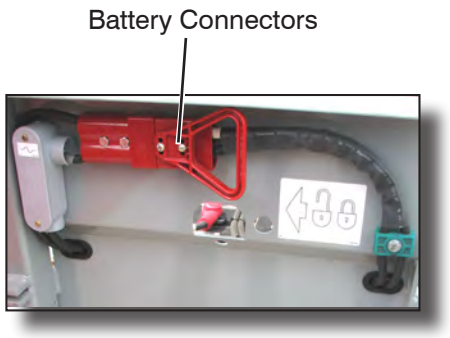


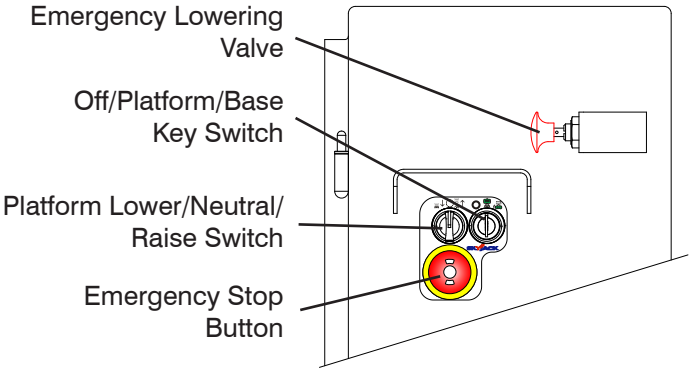
- **Disc Brake**
  - Ensure there are no loose or missing parts and there is no visible damage.
- **Drive Motor**
  - Ensure there are no loose or missing parts and there is no visible damage.
  - Ensure all bolts are properly tightened.
- **Ladder**
  - Ensure there are no loose or missing parts and there is no visible damage.
- **Outriggers**
  - Ensure there are no loose or missing parts and there is no visible damage.

1.1-9 Manuals

Ensure a copy of operating manual, and other important documents are enclosed in manual storage box.

- Check to be sure manual storage box is present and in good condition.
- Ensure manuals are legible and in good condition.
- Always return manuals to the manual storage box after use.





1.2 Function Tests

Function tests are designed to discover any malfunctions before aerial platform is put into service. The operator must understand and follow step-by-step instructions to test all aerial platform functions.

WARNING

Never use a malfunctioning aerial platform. If malfunctions are discovered, aerial platform must be tagged and placed out of service. Repairs to aerial platform may only be made by a qualified service technician.

After repairs are completed, operator must perform a pre-operation inspection and a series of function tests again before putting aerial platform into service.

Prior to performing function tests, be sure to read and understand Section 2.10 - Start Operation of the operating manual.

1.2-1 Test Battery Connectors

1. In battery roll-out tray, disconnect battery connectors.
   Result: Aerial platform functions should not operate.

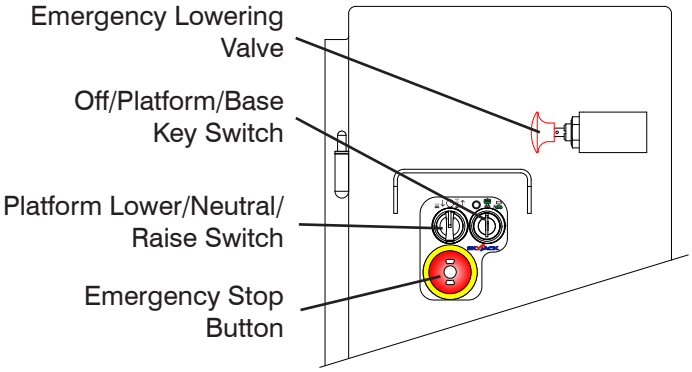
•

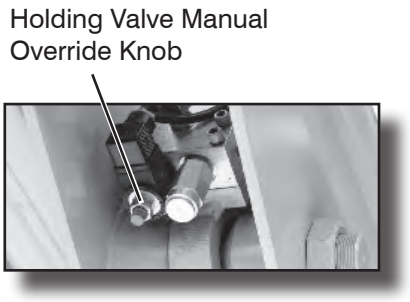
1.2-2 Base Control Console

WARNING

Ensure that you maintain three points of contact when using the ladder to mount/ dismount platform.

1. Use the ladder of aerial platform to access platform.
2. Close the gate.
3. On platform control console, pull out "" emergency stop button.
4. Insert key into base/off/platform key switch and select "" base position.
5. Use the ladder to dismount from platform.
6. On battery roll-out tray, ensure battery connectors are properly connected.
7. On base control console, pull out "" emergency stop button. A beeping sound should be audible and light should come on.





WARNING

If beeping sound is not audible and light does not come on, aerial platform must be tagged and placed out of service.

- **Test Base Emergency Stop**

1. Push in base "" emergency stop button and attempt to raise or lower the platform.
   Result: Platform raising and lowering functions should not operate.

2. Turn key clockwise to activate base "" emergency stop button.
2. Pull out base "" emergency stop button.

- **Test Off/Platform/Base Switch**

WARNING

Be aware of overhead obstructions or other possible hazards around the aerial platform when lifting.

1. Select off/platform/base key switch "" off position. Attempt to raise or lower the platform.
   Result: Platform raising and lowering functions should not operate.

2. Select off/platform/base key switch to "" platform position. Attempt to raise or lower the platform.
   Result: Platform raising and lowering functions should not operate.

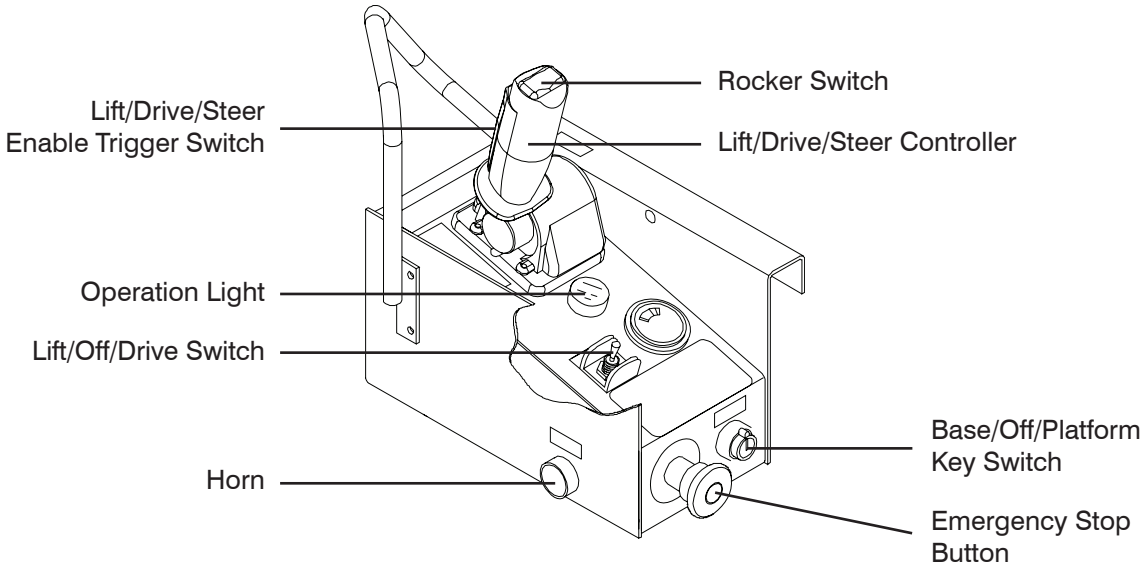
3. Select and hold off/platform/base key switch to "" base position. Attempt to raise or lower the platform.
   Result: Platform raising and lowering functions should operate.

- **Test Lower/Neutral/Raise Switch**

1. Select and hold off/platform/base key switch to "" base position and "" raise the platform with lower/neutral/ raise switch.
   Result: Platform should rise.

2. Select and hold off/platform/base key switch to "" base position and "" lower the platform with lower/ neutral/raise switch.
   Result: Platform should lower.

-



- **Test Emergency Lowering**

1. Raise the platform.
2. Locate holding valve manual override knob at the base of each lift cylinder. Depress and turn counterclockwise. If necessary, use emergency lowering access rod that is located on the base of the aerial platform.
3. On hydraulic/electrical compartment, pull out and hold emergency lowering valve to fully lower the platform.
   Result: The platform should lower.
4. To restore normal operation, depress and turn holding valve manual override knobs clockwise.

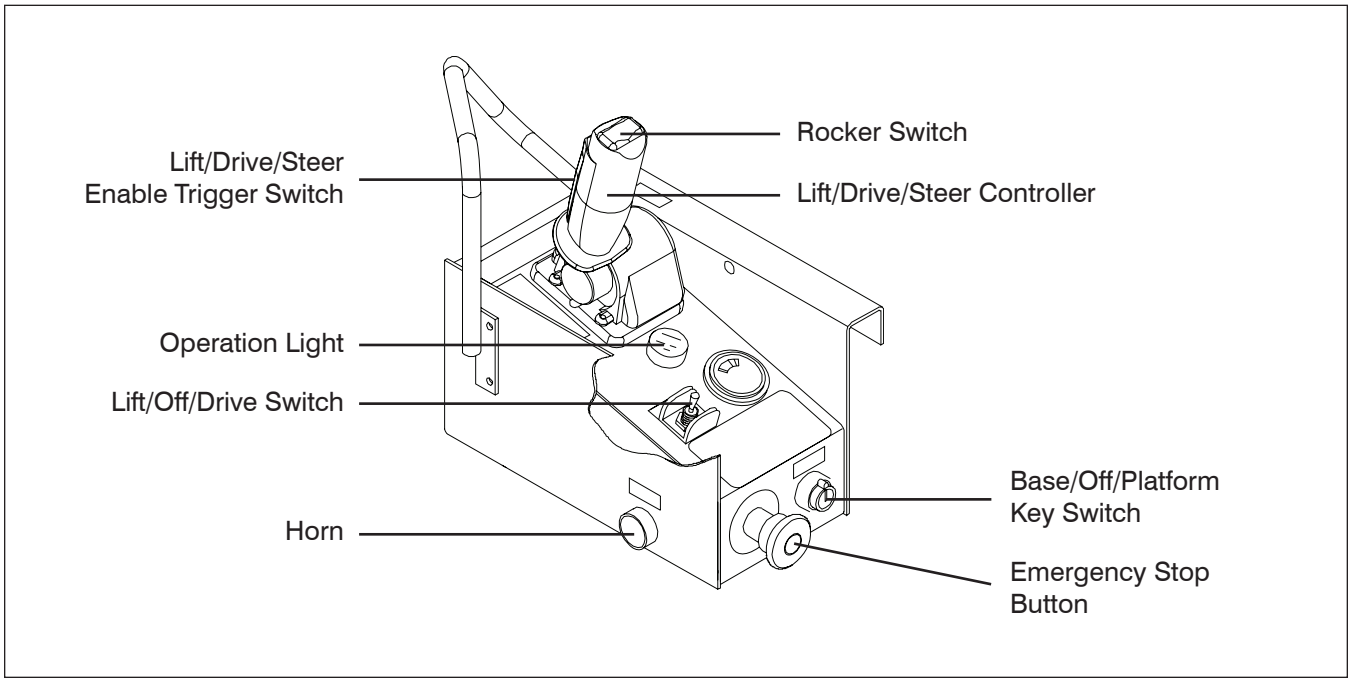
1.2-3 Platform Control Console

1. On battery roll-out tray, ensure battery connectors are properly connected.
2. On base control console, ensure base "" emergency stop button is pulled out.
3. Select off/platform/base key switch to "" platform position.

WARNING

Ensure that you maintain three points of contact when using the ladder to mount/ dismount platform.

4. Use the ladder of aerial platform to access platform.
5. Close the gate.
6. Insert key into base/off/platform key switch and select "" platform position.
7. On platform control console, pull out "" emergency stop button.



- **Test Platform Emergency Stop**

  1. Push in " " emergency stop button and attempt to activate any platform function.
     Result: All selected platform functions should not operate.

- **Test Enable Trigger Switch**

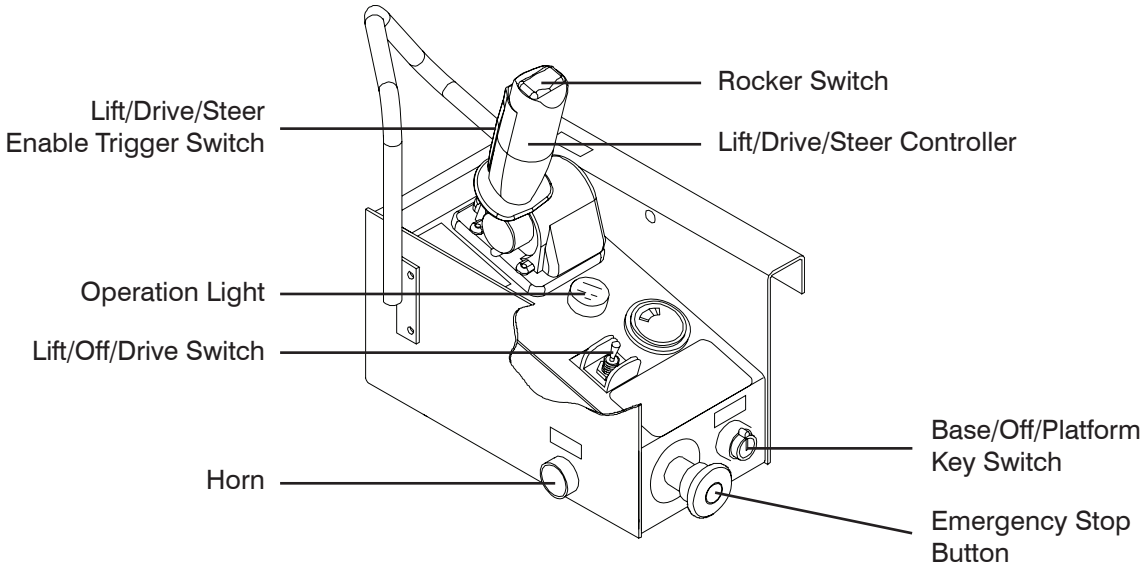
  1. Pull out " " emergency stop button.
  2. Without activating " " enable trigger switch, attempt to activate any platform function.
     Result: All platform functions should not operate.

- **Test Platform Raising/Lowering**

WARNING

Be aware of overhead obstructions or other possible hazards around the aerial platform when lifting.

1. Select lift/off/drive switch to " " lift position.
2. Activate and hold " " enable trigger switch.
3. Push controller handle and raise the platform to an approximate height of 0.5 meter.
   Result: Platform should rise.
4. Pull controller handle and lower the platform fully.
   Result: Platform should lower.



- **Test Lowering Warning**

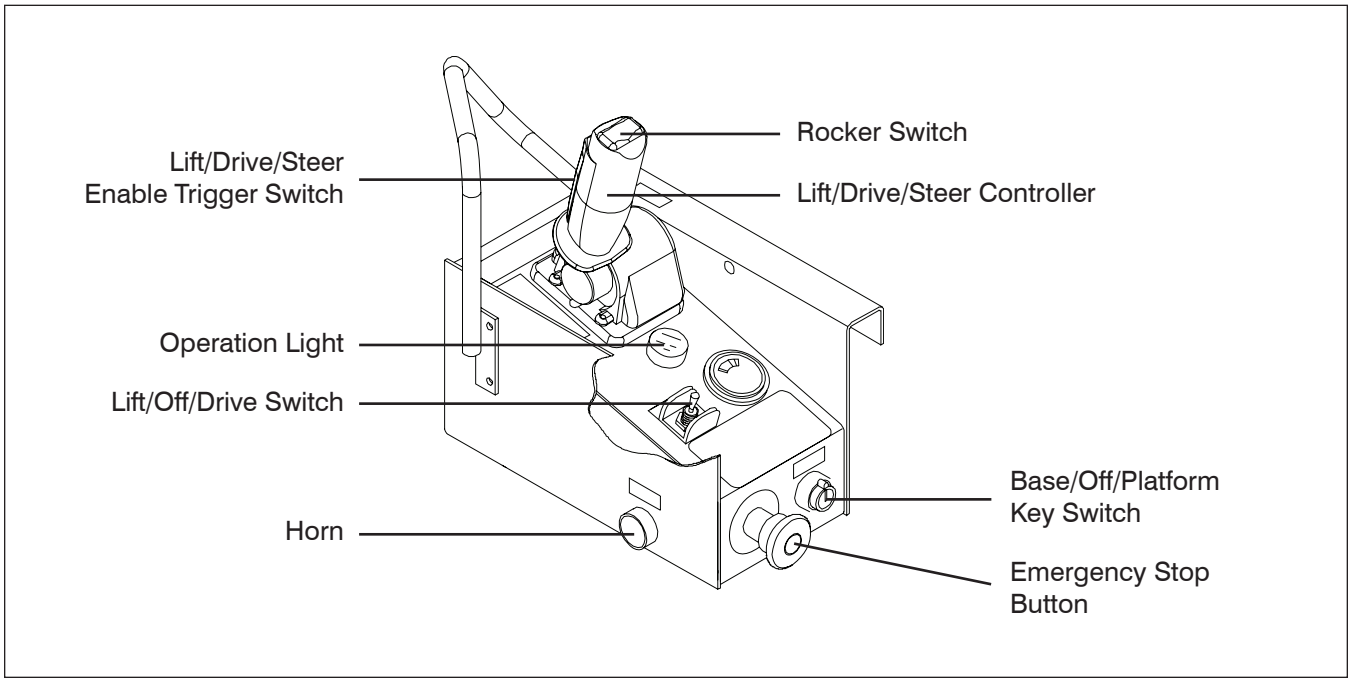
  1. Raise the platform until approximately a height of 3 to 4 meters is reached them attempt to fully lower the platform.
     Result: Platform should stop lowering at a height of 2.5 meters high and an alarm should sound.
  2. Release controller handle, ensure area around scissor is clear, then continue lowering the platform.

- **Test Steering**

  1. Select lift/off/drive switch to "↕" drive position.
  2. Activate and hold "" enable trigger switch.
  3. Press rocker switch on top of controller handle to "" left and "" right.
     Result: Steer wheels should turn left and right.

- **Test Driving**

  1. Ensure path of intended motion is clear.
  2. Activate and hold ""enable trigger switch.
  3. Slowly move controller handle in "↑" forward direction until aerial platform begins to move, and then return handle to center position.
     Result: Aerial platform should move in forward direction, and then come to a stop.
  4. Slowly move controller handle in "↓" reverse direction until aerial platform begins to move, and then return handle to center position.
     Result: Aerial platform should move in reverse direction, and then come to a stop.



- **Test Brakes**

WARNING

Brakes will engage instantly when you release the controller handle, causing aerial platform to stop immediately.

1. Ensure path of intended motion is clear.
2. Activate and hold "" enable trigger switch.
3. Drive aerial platform "" forward. Test brake by releasing controller handle.
   Result: Aerial platform should come to a stop. If aerial platform pulls to one side while stopping, do not operate aerial platform until brake adjustments have been checked.
4. Drive aerial platform "" forward. Test brake again by releasing "" enable trigger switch only.
   Result: Aerial platform should come to an instant and abrupt stop. If aerial platform does not stop immediately, or if aerial platform pulls to one side while stopping, do not operate aerial platform until brake adjustments have been checked.

- **Test Elevated Drive Speed**

WARNING

Be aware of overhead obstructions or other possible hazards around the aerial platform when lifting.

1. Ensure path of intended motion is clear.
2. Raise the platform until approximately a height of 2 meters is reached and attempt to drive forward or reverse.
   Result: Aerial platform should move slower than when it is in stowed position.

- **Test Horn**

1. Push "" horn pushbutton.
   Result: Horn should sound.

Notes

Section 2
MAINTENANCE TABLES AND DIAGRAMS

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Table 2.1a Specifications and Features (CE)

MODEL	DC Electric Full-Size Rough Terrain	
	8831E	8841E
Weight *	5411 kg	6033 kg
Overall width	2.2 m	
Overall length	3.7 m	
Platform Size (inside)	1,73 m x 3,5 m	
Height		
Working Height	11.6 m	14.5 m
Platform Elevated Height	9.6 m	12.5 m
Stowed Platform Height	1.5 m	1.8 m
Drive Height	Full	
Standard Operating Times		
Lift Time (Rated Load)	46 s	71 s
Lower Time (Rated Load)	48 s	60 s
Chassis		
Normal Drive Speed	4.8 km/h	4.8 km/h
Elevated Drive Speed	0.34 km/h	0.34 km/h
Gradeablility	30%	
Tires (#6 Foam-filled)	31 x 10-16.5	
Tires (Optional) (#6 Foam-filled - Non-marking)	31 x 10-16.5	
Hydraulic Oil		
Type	ATF Dexron III	
Tank Capacity (Liters)	75.71	

149AA

* Weights are approximate; refer to serial nameplate for specific weight.

Table 2.1b Specifications and Features (ANSI/CSA)

Model		Rough Terrain E-Series			
		8831E		8841E	
Width*		10,455 lb.	4742 kg	11,355 lb.	5151 kg
Width		87.0”	2.21 m	87.0”	2.21 m
Length		137.5”	3.5 m	137.5”	3.5 m
Platform Size		68” x 133.5” (1.73 m x 3.39 m)			
Height	Working Elevated	37.0’	11.28 m	47.0’	14.3 m
	Platform Elevated	31.0’	9.5 m	41’	12.5 m
	Platform Lowered	59.0”	1.5 m	69.0”	1.75 m
	Drive	Full			
Speed	Normal Drive	2.6 mph	4.2 km/h	2.6 mph	4.2 km/h
	Elevated Drive	0.45 mph	0.72 km/h	0.45 mph	0.72 km/h
	Lift (Rated Load)	46 sec.		71 sec.	
	Lower (Rated Load)	48 sec.		60 sec.	
Tires	Standard	30 x 10-16.5 #6 Air-filled			
	Optional	#6F or #7F			
Gradeability		30%			

60125AF-ANSI

* Weights are approximate; refer to serial nameplate for specific weight.

Table 2.2a Maximum Platform Capacities (Evenly Distributed - CE)

MODEL		Total		First Extension		Second Extension	
		Capacity	Number of Occupants	Capacity	Number of Occupants	Capacity	Number of Occupants
8831E	Two Extension Platforms	908 kg	6	227 kg	2	227 kg	2
8841E	Two Extension Platforms	681 kg	5	227 kg	2	227 kg	2

150AA

NOTE:

Occupants and materials are not to exceed rated load.
Capacities listed are for standard machines equipped with #6 tires.
Refer to capacity label at sides of platform for additional information and for models equipped with options.

BEAUFORT SCALE	Wind Speed				Ground Conditions
	m/s	km/h	ft/s	mph	
3	3.4 – 5.4	12.5 – 19.4	11.5 – 17.75	5 – 12.0	Papers and thin branches move, flags wave
4	5.4 – 8.0	19.4 – 28.8	17.75 – 26.25	12.0 – 18	Dust is raised, paper whirls up, and small branches sway.
5	8.0 – 10.8	28.8 – 38.9	26.25 – 35.5	18 – 24.25	Shrubs with leaves start swaying. Wave crests are apparent in ponds or swamps.
6	10.8 – 13.9	38.9 – 50.0	35.5 – 45.5	24.5 – 31	Tree branches move. Power lines whistle. It is difficult to open an umbrella.
7	13.9 – 17.2	50.0 – 61.9	45.5 – 65.5	31 – 38.5	Whole trees sway. It is difficult to walk against the wind.

60338AC

Table 2.2b Maximum Platform Capacities (Evenly Distributed - ANSI/CSA)

MODEL		Total		First Extension		Second Extension	
		Capacity	Number of Occupants	Capacity	Number of Occupants	Capacity	Number of Occupants
8831E	No Extension Platform	2500 lb. 1134 kg	6	Not Available			
	One Extension Platform	2000 lb. 907 kg	6	500 lb. 227 kg	2	Not Available	
	Two Extension Platforms	1700 lb. 771 kg	6	500 lb. 227 kg	2	500 lb. 227 kg	2
8841E	No Extension Platform	1700 lb. 771 kg	5	Not Available			
	One Extension Platform	1500 lb. 680 kg	5	500 lb. 227 kg	2	Not Available	
	Two Extension Platforms	1500 lb. 680 kg	5	500 lb. 227 kg	2	500 lb. 227 kg	2

60279AD-ANSI

NOTE:

Occupants and materials are not to exceed rated load.
Capacities listed are for standard machines equipped with #6 tires.
Refer to capacity label at sides of platform for additional information and for models equipped with options.

Table 2.3a Floor Loading Pressure (CE)

MODEL		Total Aerial Platform Weight	Total Aerial Platform Load		
			WHEEL	LCP **	OUP **
		kg	kg	kPa	kg/m^2
8831E	min*	5536	2164	1254	719
	max*	6788	2645	1399	882
8831E Outrigger Pads	min*	5831	2282	451	690
	max*	6788	2645	525	804
8841E	min*	6119	2410	1312	795
	max*	7145	2800	1455	928
8841E Outrigger Pads	min*	6415	2528	496	759
	max*	7145	2800	553	846

151AC-CE

* **min** - Total aerial platform weight with no options
max - Aerial platform weight + all options

** **LCP** - **Locally Concentrated Pressure** is a measure of how hard the aerial platform presses on the areas in direct contact with the floor. The floor covering (tile, carpet, etc.) must be able to withstand more than the indicated values above.

OUP - **Overall Uniform Pressure** is a measure of the average load the aerial platform imparts on the whole surface directly underneath it. The structure of the operating surface (beams, etc.) must be able to withstand more than the indicated values above.

NOTE:

The **LCP** or **OUP** that an individual surface can withstand varies from structure to structure and is generally determined by the engineer or architect for that particular structure.

Table 2.3b Floor Loading Pressure (ANSI/CSA)

MODEL		Total Aerial Platform Weight		Total Aerial Platform Load					
				WHEEL		LCP **		OUP **	
		lb.	kg	lb.	kg	psi	kPa	psf	kg/m^2
8831E	min*	10455	4742	4182	1897	114.4	788.8	160.8	785.1
	max*	14135	6412	5654	2565	127.3	877.7	217.5	1061.9
8831E Outrigger Pads	min*	11325	5137	4530	2055	57.7	397.8	168.8	824.2
	max*	15050	6827	6020	2731	76.7	528.8	224.3	1095.1
8841E	min*	11355	5151	4542	2060	118.0	813.6	174.7	852.9
	max*	14835	6729	5934	2692	129.3	891.5	228.2	1114.3
8841E Outrigger Pads	min*	12225	5545	4890	2218	62.3	429.5	182.2	889.5
	max*	15825	7178	6330	2871	80.6	556.0	235.8	1151.5

60614AA-ANSI

* **min** - Total aerial platform weight with no options
max - Aerial platform weight + all options

** **LCP** - **Locally Concentrated Pressure** is a measure of how hard the aerial platform presses on the areas in direct contact with the floor. The floor covering (tile, carpet, etc.) must be able to withstand more that the indicated values above.

OUP - **Overall Uniform Pressure** is a measure of the average load the aerial platform imparts on the whole surface directly underneath it. The structure of the operating surface (beams, etc.) must be able to withstand more than the indicated values above.

NOTE:

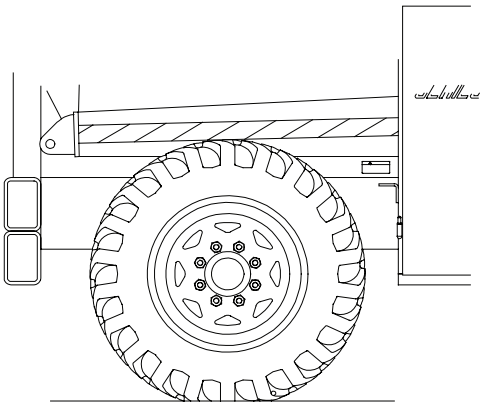
The **LCP** or **OUP** that an individual surface can withstand varies from structure to structure and is generally determined by the engineer or architect for that particular structure.

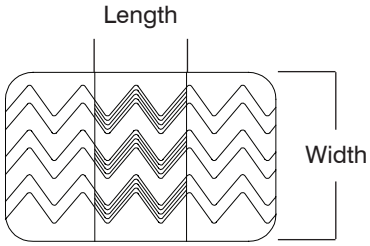
Floor Loading Pressure

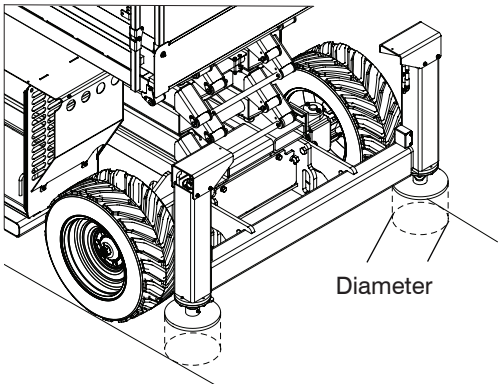
Locally Concentrated Pressure (LCP):

Foot Print Area = Length x Width
$= \pi r^2$

$$LCP = 0.4 \times \frac{\text{Weight of Aerial Platform + Capacity}}{\text{Foot Print Area}}$$



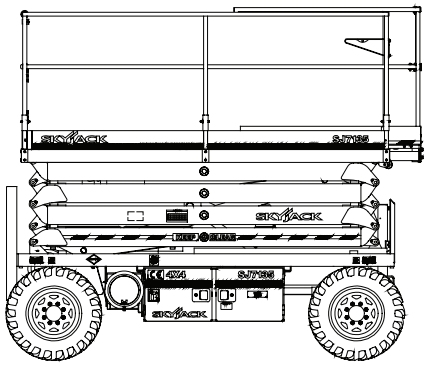


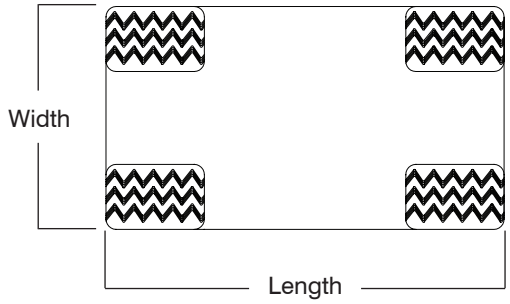


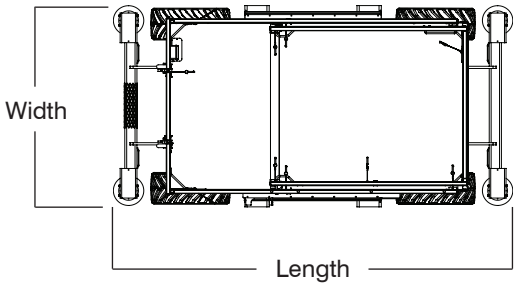
Overall Uniform Pressure (OUP):

Base Area = Length x Width

$$OUP = \frac{\text{Weight of Aerial Platform + Capacity}}{\text{Base Area}}$$







WARNING

Intermixing tires of different types or using tires of types other than those originally supplied with this equipment can adversely affect stability. Therefore, replace tires only with the exact original Skyjack-approved type. Failure to operate with matched approved tires in good condition may result in death or serious injury.

Table 2.4a Tire Specifications (CE)

WARNING

Tires should be checked by end user on a daily basis. Do not intermix tires of different types on one aerial platform. Use only tires of type originally supplied.

Tire Size		Tire Specification				Usage*	
		Fill Type	Ply Rating	Backspace Rim Size	Pressure (Factory) (kPa)	8831E	8841E
#6F	10-16.5 CARLISLE US LOADER	Foam	10	121 mm 4 ¾"	N/A	S	S
#6F	10-16.5 OTR OUTRIGGER (Non-Marking)		10	121 mm 4 ¾"	N/A	O	O

152AA

* Usage: (**S**)tandard Or (**O**)ptional
(**N**/**A**) Not Available

Rim Backspace Diagram

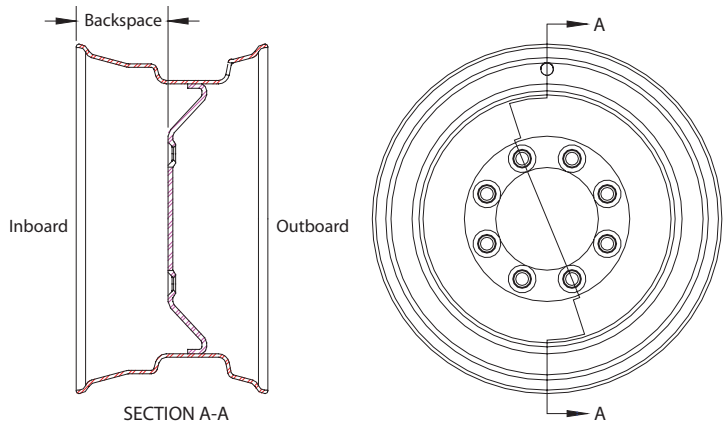


Table 2.4b Tire Specifications (ANSI/CSA)

WARNING

Air pressure can affect stability. Temperature changes can affect air pressure. It is important to visually inspect all tires for proper tire inflation prior to use. Tires should be checked by end user on a daily basis. Tire inflation pressures must be checked weekly with a calibrated gauge. If the measured pressure is less than the specification, reinflate to the pressure specified below. Tires must not be inflated above the recommended specification. Do not intermix tires of different types on one aerial platform. Use only tires of type originally supplied.

Tire Size		Tire Specification				Usage†	
		Fill Type	Ply Rating	Backspace Rim Size	Pressure (Factory) (kPa)	8831E	8841E
#6A	10-16.5 CARLISLE US LOADER	Air	10	4 ¾" 121 mm	75* (517.1)*	S	S
#6A	10-16.5 OTR OUTRIGGER (Non-Marking)		10	4 ¾" 121 mm	75* (517.1)*	O	O
#6F	10-16.5 CARLISLE US LOADER	Foam	10	4 ¾" 121 mm	N/A	O	O
#6F	10-16.5 OTR OUTRIGGER (Non-Marking)		10	4 ¾" 121 mm	N/A	O	O

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* Factory preset @ 20°C, **Check pressures regularly as tires can lose pressure over time and over different ambient temperatures even under normal conditions.**

† Usage: (**S**)tandard Or (**O**)ptional
(**N**/**A**) Not Available

Rim Backspace Diagram

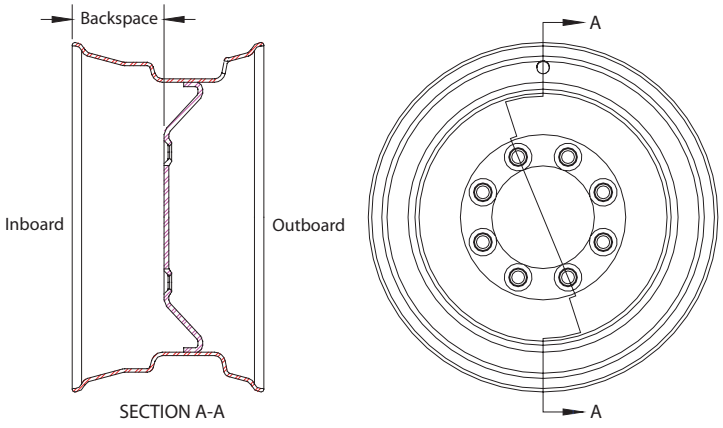

Table 2.5 Rough Terrain Scissor Fluids

AXLE OIL					
Axle Type		Capacity (Liters)	Capacity (US Gallons)	Oil Type	Recommended Equivalent Oil
Cushman	Front	2.4	0.634	Gear Oil, 80W-90 GL5	-
Dana	Front / Rear				
Cushman	Rear	1	0.264	Gear Oil, ESI 80W-90	Chevron Gear Lubricant Delo ESI 80W-90, Caltex Gear Lubricant ESI 80W-90, Caltex RPM Borate EP 80W-90, Texaco Star Gear Lubricant 80W-90

CENTER DRIVE OIL				
Center Drive Type	Capacity (Liters)	Capacity (US Gallons)	Oil Type	Recommended Equivalent Oil
Center Drive	1	0.26	Gear Oil, 80W-90 GL5	-

HYDRAULIC OIL			
Model	Capacity (Liters)	Capacity (US Gallons)	Oil Type
SJRT-68XX	86.88	22.95	ATF Dexron III
SJRT-7127	80.48	21.26	
SJRT-7135			
SJRT-8243			
SJRT-8850			
SJRT-8831	75.71	20	
SJRT-8841			
SJRT-8831E			
SJRT-8841E			
SJRT-9241	67.38	17.8	
SJRT-9250			

Table 2.6 Torque Specifications

Directional valve mounting bolts	28-32 lbf.in	3.16 - 3.61 Nm
Wheel mounting bolts	135-145 lbf.ft	183 – 196 Nm
Center drive sprocket mounting bolts	110-115 lbf.ft (242 LOCTITE)	149 – 156 Nm
Hydraulic drive motor mounting bolts	120 lbf.ft (242 LOCTITE)	162 Nm
Positive battery post cable/fuse nut	90 lb-in	10.2 Nm

Cartridge

Torque	Size					
	08	38	58	10	12	16
Lbf.ft (max)	20			25	35	50
Lbf.in (max)	240			300	420	600
Nm (max)	27.12			33.90	47.46	67.80

Coils

Torque	Size
	All coils
Lbf.ft (max)	4 to 5
Lbf.in (max)	48 to 60
Nm (max)	5.42 to 6.78

SAE Plugs

Torque	Size							
	2	4	5	6	8	10	12	16
Lbf.ft (max)	3	10	15		25		30	35
Lbf.in (max)	36	120	180		300		360	420
Nm (max)	4.07	13.56	20.34		33.90		40.68	47.46

Newton-meter = Nm | **Pound-force foot = lbf.ft** | **Pound-force inch = lbf.in**

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Section 3
SYSTEM COMPONENT IDENTIFICATION AND SCHEMATICS

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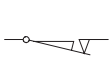
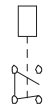
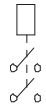
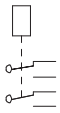
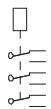
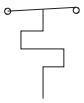
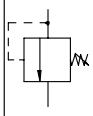
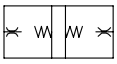
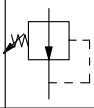
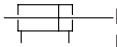
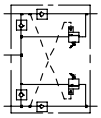
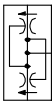
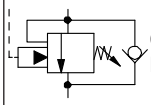
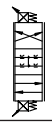
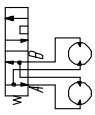
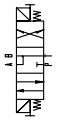
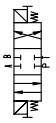
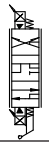
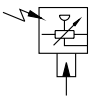
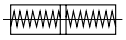
3.1 Electrical Symbol Chart

WIRE CROSSING	HOURMETER	KEY SWITCH	ANGLE TRANSDUCER
WIRES JOINED	LIGHT	FOOT SWITCH	PRESSURE TRANSDUCER
BATTERY	HYDRAULIC VALVE COIL	TOGGLE SWITCH	LIMIT SWITCH N.O.
GROUND	PROPORTIONAL HYDRAULIC VALVE COIL	PUSH BUTTON	LIMIT SWITCH N.O. HELD CLOSED
FUSE	ELECTRIC MOTOR	ROTARY SWITCH	 LIMIT SWITCH N.C.
CIRCUIT BREAKER	HORN	LIMIT SWITCH	LIMIT SWITCH N.C. HELD OPEN
BATTERY CHARGE INDICATOR	EMERGENCY STOP BUTTON	CAM OPERATED LIMIT SWITCH	SILICON CONTROLLED RECTIFIER
CAPACITOR	RESISTOR	TILT SWITCH	PROXIMITY SWITCH
POTENTIOMETER	LEVEL SENSOR	SINGLE POLE SINGLE THROWN RELAY	PNP TRANSISTOR
 SINGLE POLE DOUBLE THROW RELAY	 DOUBLE POLE SINGLE THROW RELAY	 DOUBLE POLE DOUBLE THROW RELAY	NPN TRANSISTOR
 TRIPLE POLE DOUBLE THROW RELAY	DIODE	TRANSISTOR	PRESSURE/ VACUUM SWITCH
 TEMPERATURE SWITCH			

3.2 Hydraulic Symbol Chart

LINE CROSSING	VARIABLE DISPLACEMENT PUMP	SHUTTLE VALV	VELOCITY FUSE
LINE JOINED	HAND PUMP	ACCUMULATOR, GAS CHARGED	SINGLE ACTING CYLINDER
HYDRAULIC TANK	 RELIEF VALVE	 CUSHION CYLINDER	DOUBLE ACTING CYLINDER
HYDRAULIC FILTER WITH BYPASS	 PRESSURE REDUCING VALVE	PRESSURE SWITCH	 DOUBLE ACTING DOUBLE RODDED
ELECTRIC MOTOR	FIXED ORIFICE	 MOTION CONTROL VALVE	SPRING APPLIED HYDRAULIC RELEASED BRAKE
ENGINE	ADJUSTABLE FLOW CONTROL	 FLOW DIVIDER COMBINER	BRAKE CYLINDER
FIXED DISPLACEMENT PUMP	CHECK VALVE	 COUNTER BALANCE VALVE	ROTARY ACTUATOR
 THREE POSITION FOUR WAY PROPORTIONAL	OIL COOLER	VALVE COIL	BI DIRECTIONAL HYDRAULIC MOTOR
 SERIES PARALLEL HYDRAULIC MOTOR	TWO POSITION TWO WAY NORMALLY CLOSED	TWO POSITION THREE WAY	 THREE POSITION FOUR WAY CLOSED CENTER OPEN PORT
TWO POSITION TWO WAY NORMALLY OPEN	TWO POSITION THREE WAY	 THREE POSITION FOUR WAY CLOSED CENTER CLOSED PORT	 THREE POSITION FOUR WAY PROPORTIONAL
 PRESSURE TRANSDUCER	MAIN LINES Solid	PILOT LINES Dashed	VARIABLE DISPLACEMENT HYDRAULIC MOTOR
 SERVO	QUICK DISCONNECT		

3.3 Hydraulic Schematic Parts List

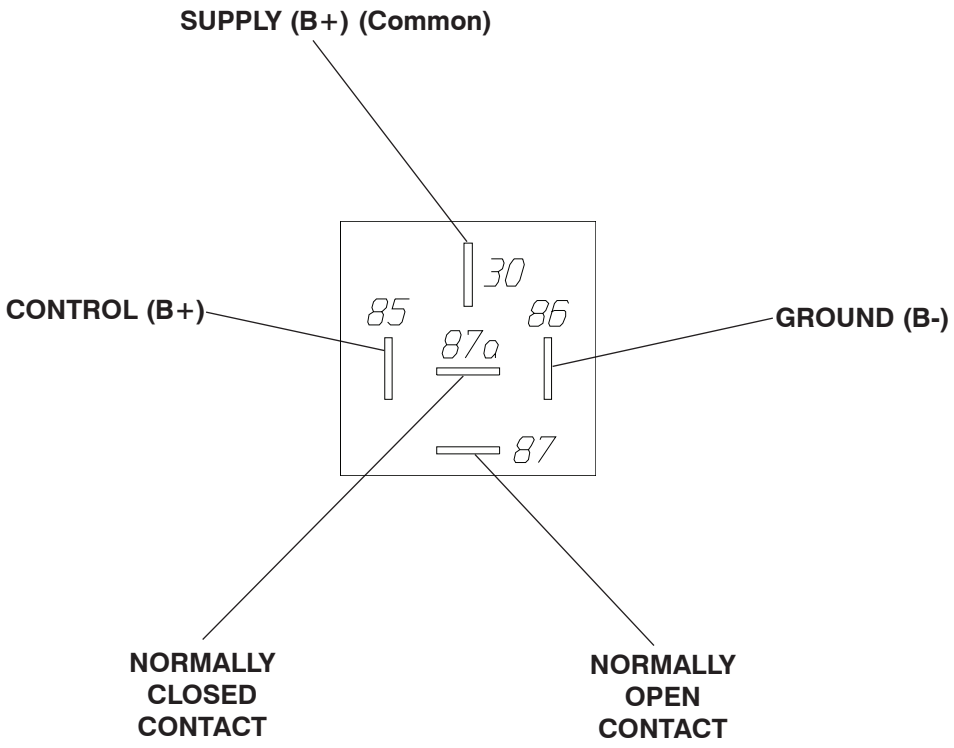
Index No.	Skyjack Part No.	Qty.	Description
C1	120349	1	CYLINDER, Lift
C2	120349	1	CYLINDER, Lift
C3	120275	1	CYLINDER, Extension platform (Front)
C4	120275	1	CYLINDER, Extension platform (Rear)
C5	120412	1	CYLINDER, Disc brake
C7	120405	1	CYLINDER, Steer
C9	132694	1	CYLINDER, Outrigger (Left front)
C10	132694	1	CYLINDER, Outrigger (Right front)
C11	132694	1	CYLINDER, Outrigger (Right rear)
C12	132694	1	CYLINDER, Outrigger (Left rear)
CV1	104567	1	VALVE, Check (Small pump)
CV2	104567	1	VALVE, Check (Large pump)
CV3	104567	1	VALVE, Check (Brake)
CV4	104567	1	VALVE, Check (Lift)
CV5	104567	1	VALVE, Check
CV6	104567	1	VALVE, Check
CV7	104115	1	VALVE, Check (Left front outrigger)
CV8	104115	1	VALVE, Check (Right front outrigger)
CV9	104115	1	VALVE, Check (Right rear outrigger)
CV10	104115	1	VALVE, Check (Left rear outrigger)
F1	109568	1	FILTER, Return
	104254	1	• ELEMENT, Filter
HP2	110652	1	PUMP, Hand
MB1	108803	1	MANIFOLD BLOCK (Main)
MB2	113494	1	MANIFOLD BLOCK (Lowering)
MB3	130443	1	MANIFOLD BLOCK (Holding valve)
MB4	106688	1	MANIFOLD BLOCK (Holding valve)
MB5	107382	1	MANIFOLD BLOCK (Powered platform)
MB6	119748	1	MANIFOLD BLOCK (Lift)
MB7	116586	1	MANIFOLD BLOCK (Quick brake)
MB8	111970	1	MANIFOLD BLOCK (Outrigger)
O1	114218	1	ORIFICE, Controller lowering (0.70”)
O2	120481	1	ORIFICE, Lowering (0.104”) (Lift cylinder)
O3	120481	1	ORIFICE, Lowering (0.104”) (Lift cylinder)
O4	120756	1	ORIFICE, Lowering (0.149”)
O5	116725	1	ORIFICE, Emergency lowering (0.067”)
O6	123853	1	ORIFICE, Dump valve (0.031”)
P1	119999	1	PUMP (Gearbox)
P2	700669	1	PUMP (Hydraulic tray)
PT1	130440	1	TRANSDUCER, Pressure **(CE)**
QD1	122420	1	QUICK DISCONNECT (System pressure)
QD2	122420	1	QUICK DISCONNECT (System pressure)
R1	104534	1	VALVE, Relief (System)
R2	104534	1	VALVE, Relief (Gearbox)
R3	106557	1	VALVE, Relief (Holding valve)
R4	106557	1	VALVE, Relief (Holding valve)

Parts list continued on the following page.

3.3 Hydraulic Schematic Parts List (Continued)

Index No.	Skyjack Part No.	Qty.	Description
			Parts list continued from the previous page.
V1	107271	1	VALVE, Manual lowering
V2	113556	1	VALVE, Controlled lowering
V6	113752	1	VALVE, Auto reset
2H-13-1	104412	1	VALVE, Lowering
2H-13-2	107269	1	VALVE, Holding
2H-13-3	107269	1	VALVE, Holding
2H-14D	104412	1	VALVE, Lift
2H-17A	103655	1	VALVE, Outrigger holding
2H-21A	114365	1	VALVE, System dump
2H-25	117189	1	VALVE, Quick brake
2H-30	104412	1	VALVE, Brake release
2H-44	104412	1	VALVE, Gearbox holding
4H-23A	153334	1	VALVE, “Hytos” (Right steer) (includes 4H-24A)
4H-24A	153334	1	VALVE, “Hytos” (Left steer) (includes 4H-23A)
4H-26	153334	1	VALVE, “Hytos” (Front platform extend) (includes 4H-27)
4H-26A	153334	1	VALVE, “Hytos” (Rear platform extend) (includes 4H-27A)
4H-27	153334	1	VALVE, “Hytos” (Front platform retract) (includes 4H-26)
4H-27A	153334	1	VALVE, “Hytos” (Rear platform retract) (includes 4H-26A)
4H-32A	153334	1	VALVE, “Hytos” (Traction gearbox) (includes 4H-33A)
4H-33A	153334	1	VALVE, “Hytos” (Lift gearbox) (includes 4H-32A)
4H-71	128318	1	VALVE, “Hytos” (Left front outrigger retract) (includes 4H-75)
4H-72	128318	1	VALVE, “Hytos” (Right front outrigger retract) (includes 4H-76)
4H-73	128318	1	VALVE, “Hytos” (Right rear outrigger retract) (includes 4H-77)
4H-74	128318	1	VALVE, “Hytos” (Left rear outrigger retract) (includes 4H-78)
4H-75	128318	1	VALVE, “Hytos” (Left front outrigger extend) (includes 4H-71)
4H-76	128318	1	VALVE, “Hytos” (Right front outrigger extend) (includes 4H-72)
4H-77	128318	1	VALVE, “Hytos” (Right rear outrigger extend) (includes 4H-73)
4H-78	128318	1	VALVE, “Hytos” (Left rear outrigger extend) (includes 4H-74)

3.4 Relay Function Chart



Index No.	Skyjack Part No.	Qty.	Description
9ECR	108589	1	RELAY, 24 Volt (Outrigger power)
10ACR1	108589	1	RELAY, 24 Volt (Outrigger enable) **(CE)**
10ACR2	108589	1	RELAY, 24 Volt (Outrigger safety) **(CE)**
10CCR	108589	1	RELAY, 24 Volt (outrigger movement indicator) **(CE)**
12CCR	126469	1	RELAY, 24 Volt (Steer switch)
12ECR	108589	1	RELAY, 24 Volt (Joystick enable)
17ACR	108589	1	RELAY, 24 Volt (Outrigger lift disable)
18ACR	108589	1	RELAY, 24 Volt (Small pump)
21CR-1	108589	1	RELAY, 24 Volt (Power deck interlock)
21CR-2	108589	1	RELAY, 24 Volt (Pump interlock)
25CR	108589	1	RELAY, 24 Volt (Quick brake)
28ACR	108589	1	RELAY, 24 Volt (Warning indicator)
28CR	108589	1	RELAY, 24 Volt (Tilt)
30CR	108589	1	RELAY, 24 Volt (Brake)
32CR	108589	1	RELAY, 24 Volt (Lift sensor)
33CR	108589	1	RELAY, 24 Volt (Traction sensor)
59ACR	108589	1	RELAY, 24 Volt (Speed signal)

Parts list continued on the following page.

3.4 Electrical Parts List

Index No.	Skyjack Part No.	Qty.	Description
			Parts list continued from the previous page.
60CR1	108589	1	RELAY, 24 Volt (Auxiliary down) (CE)
60CR2	108589	1	RELAY, 24 Volt (Auxiliary reverse) (CE)
60CR3	108589	1	RELAY, 24 Volt (Auxiliary forward) (CE)
60ECR1	108589	1	RELAY, 24 Volt (Down) (CE)
60ECR2	108589	1	RELAY, 24 Volt (Reverse) (CE)
60ECR3	108589	1	RELAY, 24 Volt (Forward) (CE)
61CR	108589	1	RELAY, 24 VOlt (Outrigger drive enable) (CE)
65CR	108589	1	RELAY, 24 Volt (Outrigger lift enable)
OCM1	132804	1	MODULE, Outrigger auto-levelling controller
2H-13B-1	105610	1	COIL, 24 Volt (Lowering)
2H-13B-2	104493	1	COIL, 24 Volt (Holding)
2H-13B-3	104493	1	COIL, 24 Volt (Holding)
2H-14D	105610	1	COIL, 24 Volt (Lifting)
2H-17A	103605	1	COIL, 24 Volt (Outrigger holding)
2H-21A	105610	1	COIL, 24 Volt (System dump)
2H-25	103605	1	COIL, 24 Volt (Quick brake)
2H-30	105610	1	COIL, 24 Volt (Brake)
2H-44	105610	1	COIL, 24 Volt (Gearbox holding)
4H-23	153335	1	COIL, 24 Volt (Right steer) (Hytos)
4H-24	153335	1	COIL, 24 Volt (Left steer) (Hytos)
4H-26	153335	1	COIL, 24 Volt (Platform extend) (Hytos)
4H-26A	153335	1	COIL, 24 Volt (Platform extend) (Hytos)
4H-27	153335	1	COIL, 24 Volt (Platform retract) (Hytos)
4H-27A	153335	1	COIL, 24 Volt (Platform retract) (Hytos)
4H-32A	153335	1	COIL, 24 Volt (Drive shift) (Hytos)
4H-33A	153335	1	COIL, 24 Volt (Lift shift) (Hytos)
4H-71	128321	1	COIL, 12 Volt (Left front outrigger retract) (Hytos)
4H-72	128321	1	COIL, 12 Volt (Right front outrigger retract) (Hytos)
4H-73	128321	1	COIL, 12 Volt (Right rear outrigger retract) (Hytos)
4H-74	128321	1	COIL, 12 Volt (Left rear outrigger retract) (Hytos)
4H-75	128321	1	COIL, 12 Volt (Left front outrigger extend) (Hytos)
4H-76	128321	1	COIL, 12 Volt (Right front outrigger extend) (Hytos)
4H-77	128321	1	COIL, 12 Volt (Right rear outrigger extend) (Hytos)
4H-78	128321	1	COIL, 12 Volt (Left rear outrigger extend) (Hytos)
AT1	130440	1	TRANSDUCER, Angle (CE)
B1	106552	8	BATTERY, 6 Amp (Trojan U-2500)
BC1	122093	1	BATTERY CHARGE INDICATOR
BC-1	129685	1	CHARGER, Battery
BC-2	129685	1	CHARGER, Battery
BP-28B	103057	1	BEEPER (Platform control console)
BP-29C	117967	1	BEEPER (XL - 600, 9 - 28 VDC) (CE)
C10D-1	119168	1	CONTACTOR, 24 Volt (Pump)
C10D-2	119169	1	CONTACTOR, 24 Volt (Main)
C15C	119170	1	CONTACTOR, 24 Volt (Reverse)
C16E	119170	1	CONTACTOR, 24 Volt (Forward)
CB1	117326	1	CIRCUIT BREAKER, Ground (20 amp)
			Parts list continued on the following page.

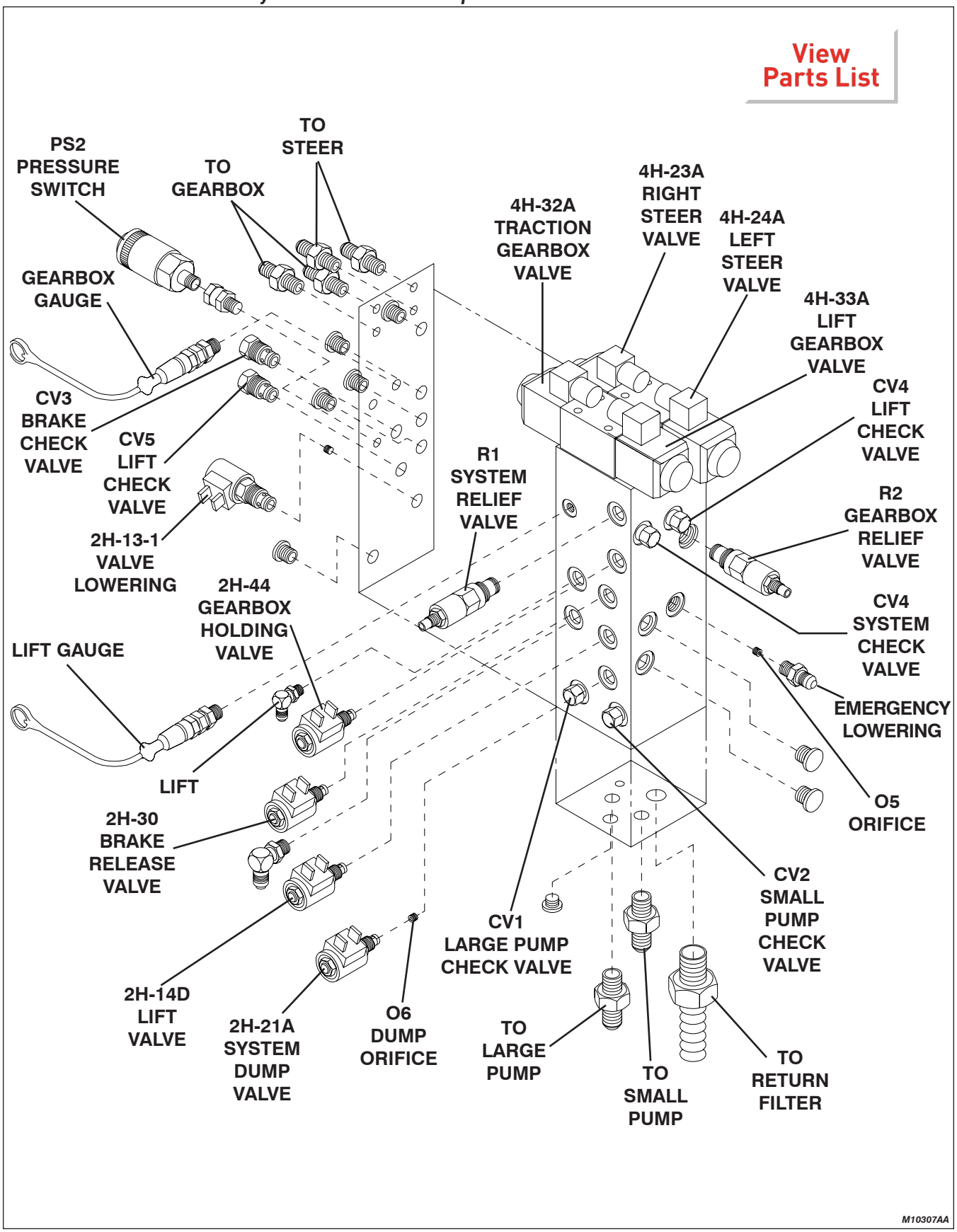
3.4 Electrical Parts List (Continued)

Index No.	Skyjack Part No.	Qty.	Description
			Parts list continued from the previous page.
CB2	117325	2	CIRCUIT BREAKER, 48 Volt (15 amp)
CB3	117326	1	CIRCUIT BREAKER, 24 Volt (20 amp)
CL-1	130224	1	CABINET LIGHT
CL-2	130224	1	CABINET LIGHT
CRD1	119373	1	CABLE ASSEMBLY (Platform control console)
CRD2	120370	1	CABLE ASSEMBLY (Scissor arm) **(Model 8831)**
	120074	1	CABLE ASSEMBLY (Scissor arm) **(Model 8841)**
CRD3	120069	1	CABLE ASSEMBLY (Electrical panel)
DCM1	116757	1	TRACTION MOTOR
DCM2	700668	1	MOTOR, 48 Volt
DPM1	118815	1	MODULE, Power delay
DXX	102921	AR	DIODE
F1	120658	1	FUSE, Right steer (10 Amp)
F2	120658	1	FUSE, Left steer (10 Amp)
F3	120658	1	FUSE, Dump (10 Amp)
F4	120658	1	FUSE, Lowering (10 Amp)
F5	120658	1	FUSE, Reverse (10 Amp)
F6	120658	1	FUSE, Forward (10 Amp)
F7	120658	1	FUSE, Drive (10 Amp)
F8	120658	1	FUSE, Pump (10 Amp)
F9	120658	1	FUSE, Lift (10 Amp)
F10	120658	1	FUSE (10Amp)
F10-2	120658	1	FUSE, Power deck option (10 Amp)
F11	120658	1	FUSE, Fault (10 Amp)
F12	119364	1	FUSE, Main power (400 Amp)
F13	120658	1	FUSE, Center tap (10 Amp)
F14	120302	1	FUSE, Charger harness & inverter (50 Amp)
F15	119172	1	FUSE (20 Amp)
F16	700776	1	FUSE (6.3 Amp)
F18	119469	1	FUSE (200 Amp)
FL22	103743	1	FLASHER
FL22A	121477	1	LIGHT, Flashing (24 Volt)
H1	146649	1	HORN, Low tone (24 Volt)
INV1	124756	1	INVERTER, 1500W 110/220V @ 50HZ
JS1	127063	1	DRIVE/STEER CONTROLLER
LCR-1	127154	1	CONTROL RELAY (inside charger)
LCR-2	127154	1	CONTROL RELAY (inside charger)
LS5	119375	1	LIMIT SWITCH, High speed cut-out (CE)
LS61	115658	1	LIMIT SWITCH, Outrigger (Left front retract)
LS62	115658	1	LIMIT SWITCH, Outrigger (Right front retract)
LS63	115658	1	LIMIT SWITCH, Outrigger (Right rear retract)
LS64	115658	1	LIMIT SWITCH, Outrigger (Left rear retract)
LS65	115658	1	LIMIT SWITCH, Outrigger (Left front extend)
LS66	115658	1	LIMIT SWITCH, Outrigger (Right front extend)
LS67	115658	1	LIMIT SWITCH, Outrigger (Right rear extend)
LS68	115658	1	LIMIT SWITCH, Outrigger (Left rear extend)
			Parts list continued on the following page.

3.4 Electrical Parts List (Continued)

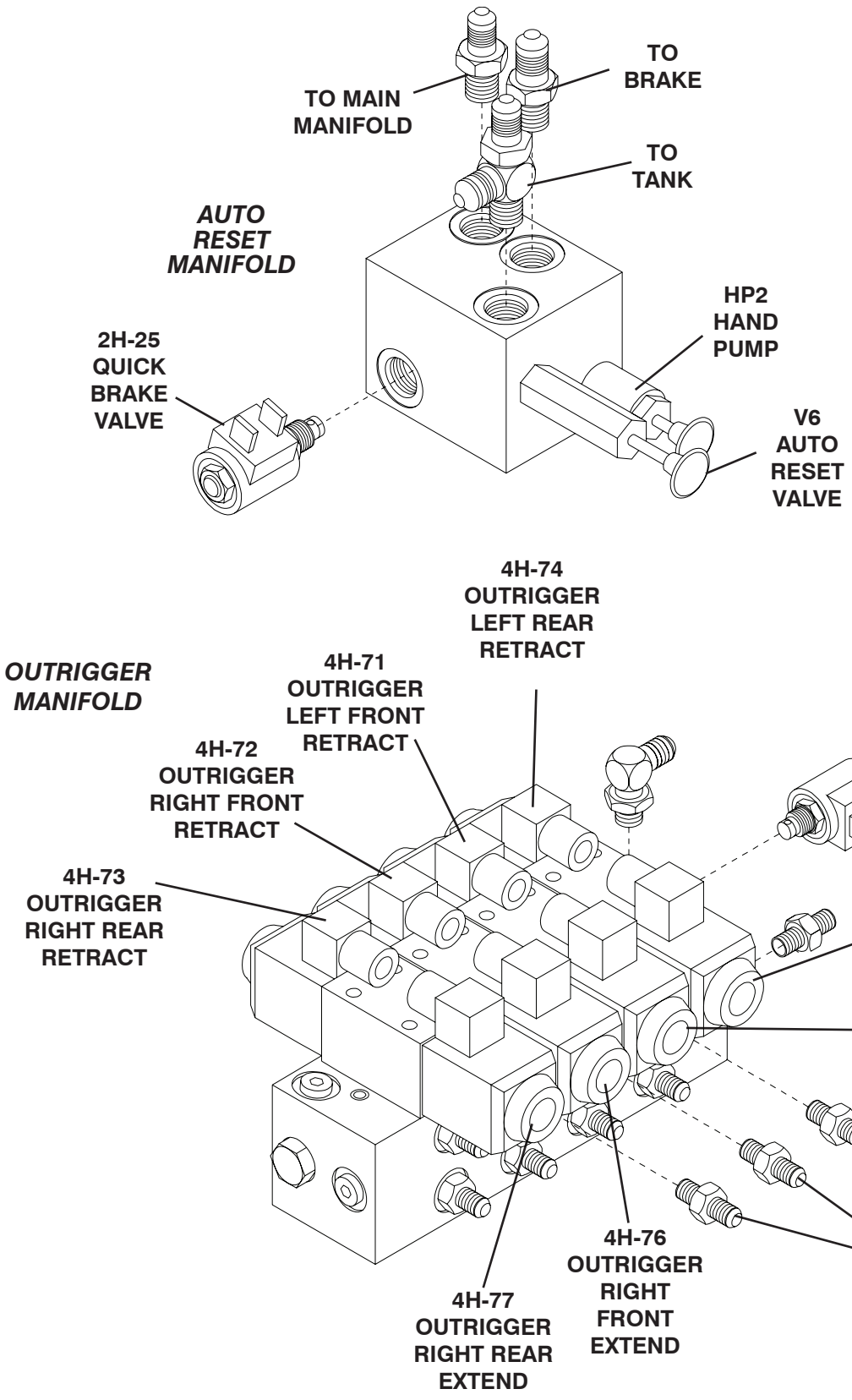
Index No.	Skyjack Part No.	Qty.	Description
			Parts list continued from the previous page.
PR1	116758	1	SWITCH, Proximity (Drive)
PR2	116758	1	SWITCH, Proximity (Lift)
PS2	701194	1	SWITCH, Pressure (Brake)
OL1	133133	1	LIGHT, Indicator amber (12 Volt)
PT1	130440	1	TRANSDUCER, Pressure **(CE)**
RL-22A	108102	1	BEACON, Rotating amber (24 Volt) **(CE)**
RST4	146004	1	RESISTOR (330 Ohm - 2 watt)
S4	147053	1	N.C. CONTACT (Emergency stop) (Base controls)
S5	147053	1	N.C. CONTACT (Off/Platform/Base) (Base controls)
	147054	1	N.O. CONTACT (Off/Platform/Base) (Base controls)
S6	147054	1	N.O. CONTACT (Up/Down) (Base controls)
S7	147053	1	N.C. CONTACT (Emergency stop) (Platform control console)
S8	147054	2	N.O. CONTACT (Base/off/platform) (Platform control console)
S9	116382	1	SWITCH, Lift/Off/Drive
S9A	102853	1	SWITCH, Enable (Outrigger)
S11	147054	1	N.O. CONTACT (Horn) (Platform control console)
S16	102853	1	SWITCH, Power deck enable (Single deck)
S17	102853	1	SWITCH, Power deck extend/retract (Single deck)
S18	102853	1	SWITCH, Power deck enable (Double deck)
S19	102853	1	SWITCH, Power deck extend/retract (Double deck)
S20	102853	1	SWITCH, Left front outrigger (Extend/Retract) (Platform control console)
S21	102853	1	SWITCH, Right front outrigger (Extend/Retract) (Platform control console)
S22	120853	1	SWITCH, Right rear outrigger (Extend/Retract) (Platform control console)
S23	102853	1	SWITCH, Left rear outrigger (Extend/Retract) (Platform control console)
S24	102853	1	SWITCH, Auto-level outrigger **(CE)**
SV1	119167	1	DRIVE SEVCON
TC1	119171	1	TACHOMETER CARD
TG1	700227	1	TACHOMETER GENERATOR
TMR-8A	132494	1	RELAY, Inverter Timer Cut-out
TT1	103336	1	HOURMETER
WL1	147061	1	LED BLOCK, Red (Trouble light)
X1	801347	1	SEVCON CONVERTOR

3.8 Hydraulic Manifold Components and Port Identifications



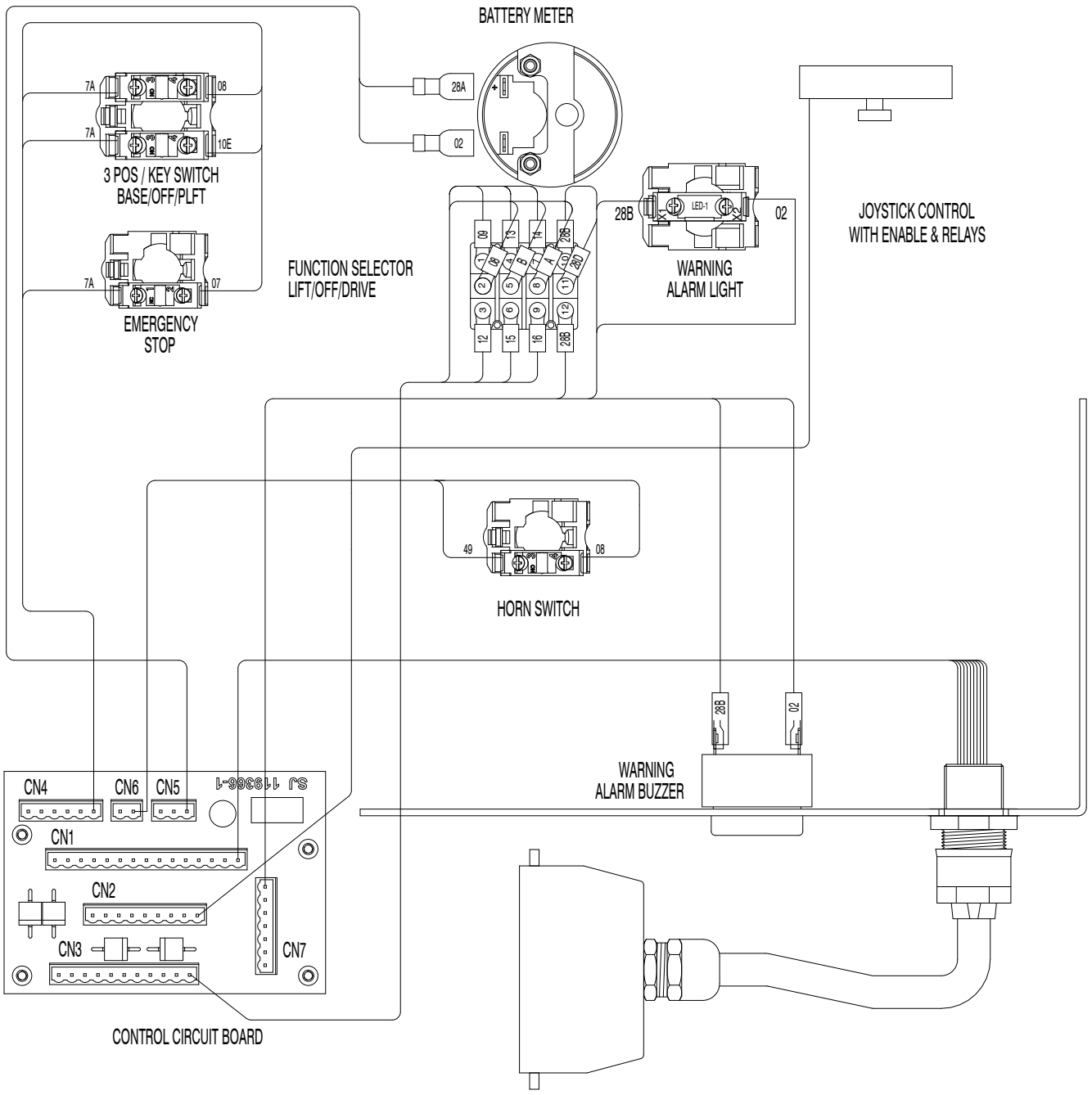
3.9 Outrigger Manifold and Auto Reset Manifold Components and Port Identifications

View Parts List



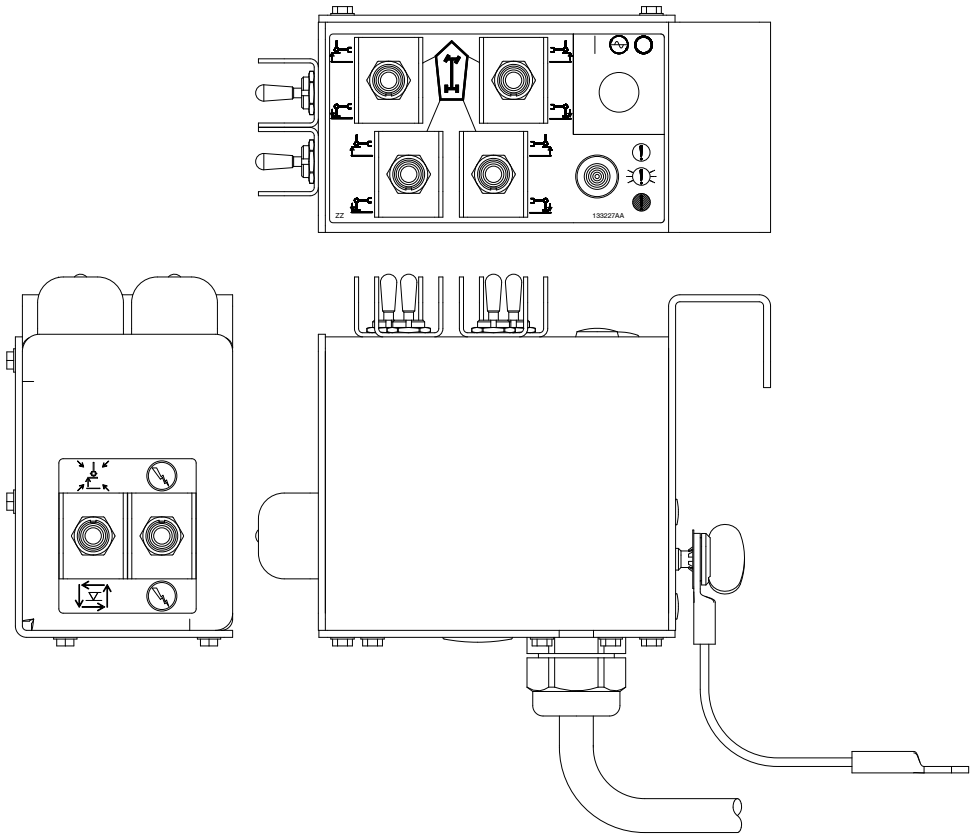
3.5 Platform Control Console Wiring Diagram

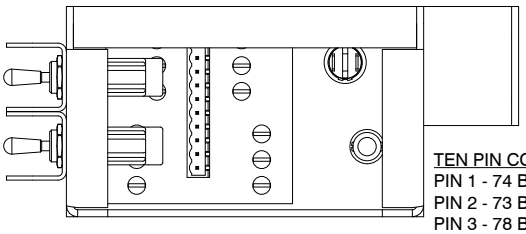
View Parts List

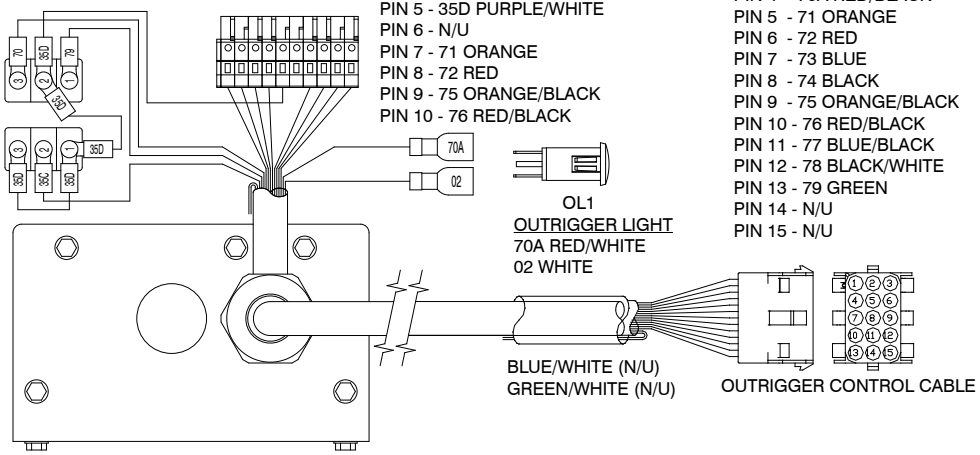


3.6 Outrigger Control Box Wiring Diagram

View Parts List







S24
AUTO-LEVEL OUTRIGGER SWITCH
PIN 1 - 79 GREEN
PIN 2 - 35D PURPLE/WHITE
PIN 3 - 70 GREEN/BLACK

S9A
OUTRIGGER ENABLE SWITCH
PIN 1 - 35D PURPLE/WHITE
PIN 2 - 35C x 3 (WHITE/BLACK, BLUE/WHITE & GREEN/WHITE)
PIN 3 - 35D PURPLE/WHITE

TEN PIN CONNECTOR PLUG
PIN 1 - 74 BLACK
PIN 2 - 73 BLUE
PIN 3 - 78 BLACK/WHITE
PIN 4 - 77 BLUE/BLACK
PIN 5 - 35D PURPLE/WHITE
PIN 6 - N/U
PIN 7 - 71 ORANGE
PIN 8 - 72 RED
PIN 9 - 75 ORANGE/BLACK
PIN 10 - 76 RED/BLACK

OL1
OUTRIGGER LIGHT
70A RED/WHITE
02 WHITE

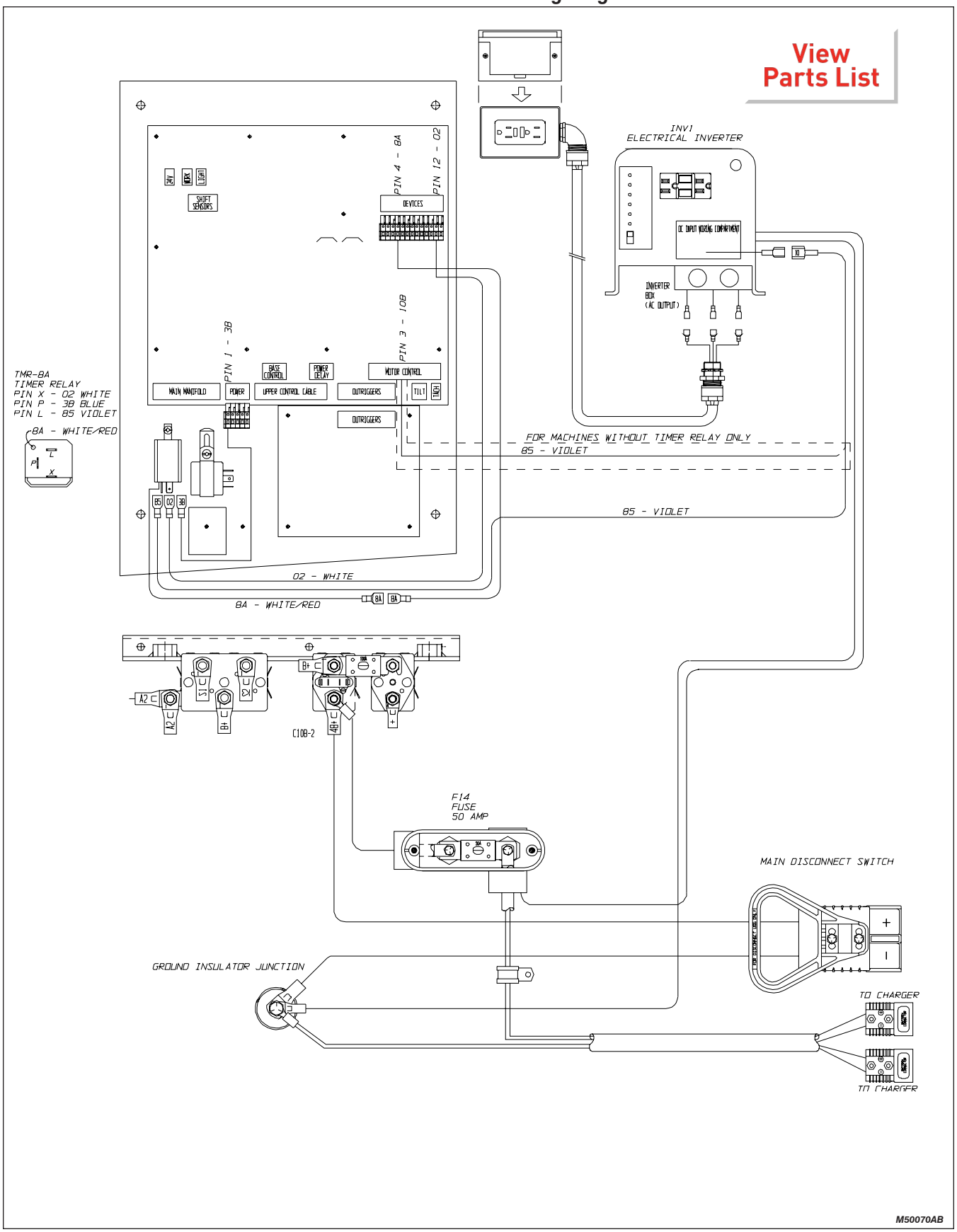
BLUE/WHITE (N/U)
GREEN/WHITE (N/U)

TO OUTRIGGER ELECTRICAL PANEL
PIN 1 - 02 WHITE
PIN 2 - 35C WHITE/BLACK
PIN 3 - 70 GREEN/BLACK
PIN 4 - 70A RED/BLACK
PIN 5 - 71 ORANGE
PIN 6 - 72 RED
PIN 7 - 73 BLUE
PIN 8 - 74 BLACK
PIN 9 - 75 ORANGE/BLACK
PIN 10 - 76 RED/BLACK
PIN 11 - 77 BLUE/BLACK
PIN 12 - 78 BLACK/WHITE
PIN 13 - 79 GREEN
PIN 14 - N/U
PIN 15 - N/U

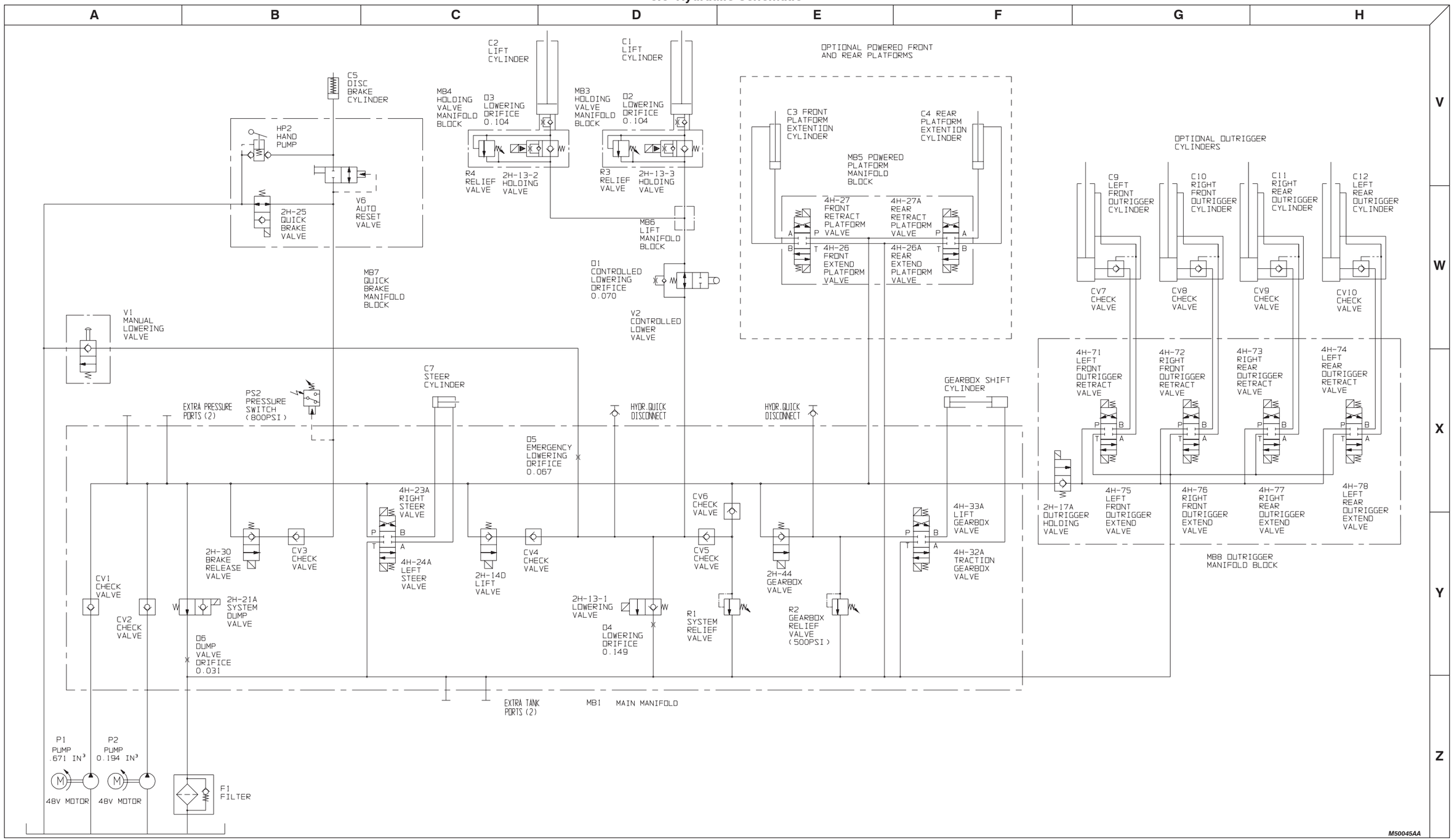
OUTRIGGER CONTROL CABLE

M129300AB2

3.7 Electrical Inverter Wiring Diagram



3.8 Hydraulic Schematic

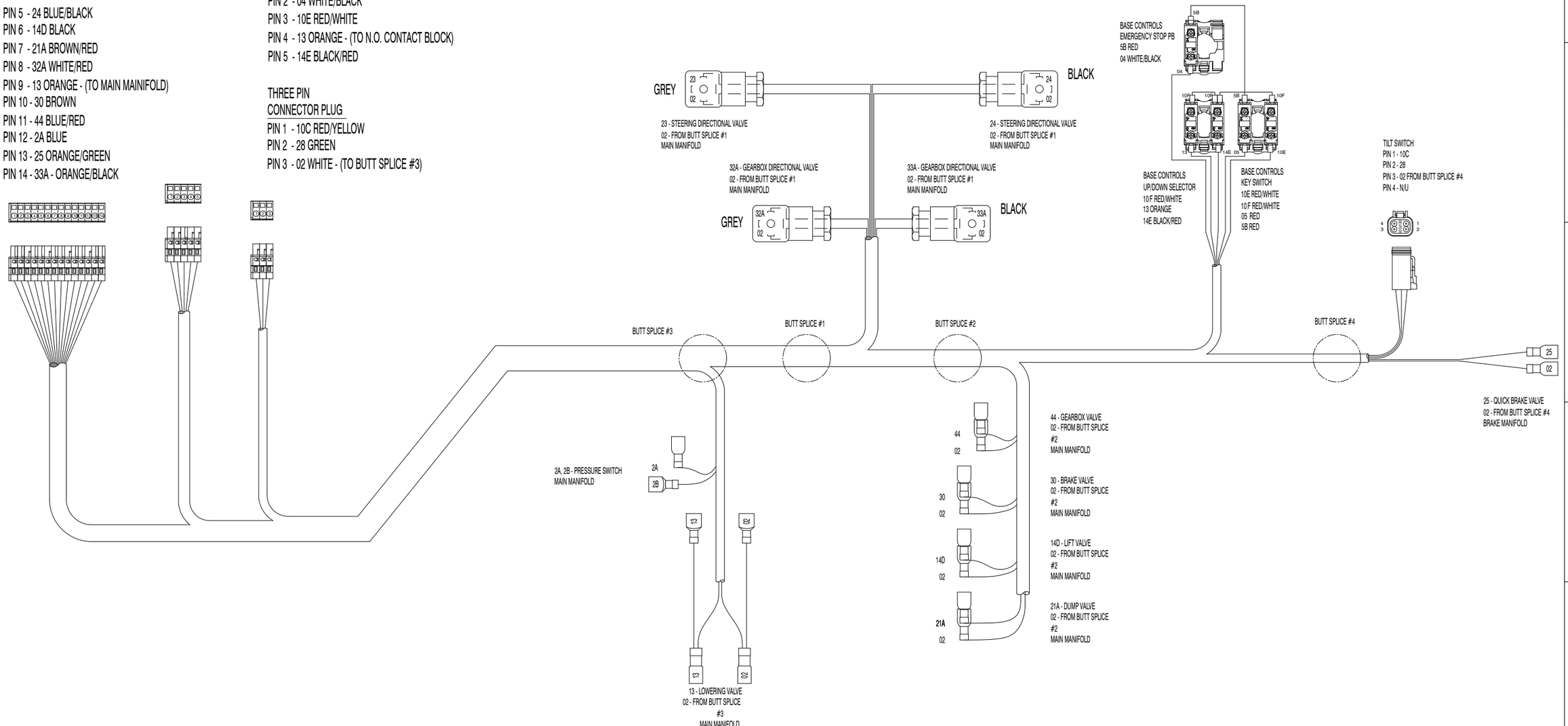


3.9 Main Manifold Harness Wiring Diagram

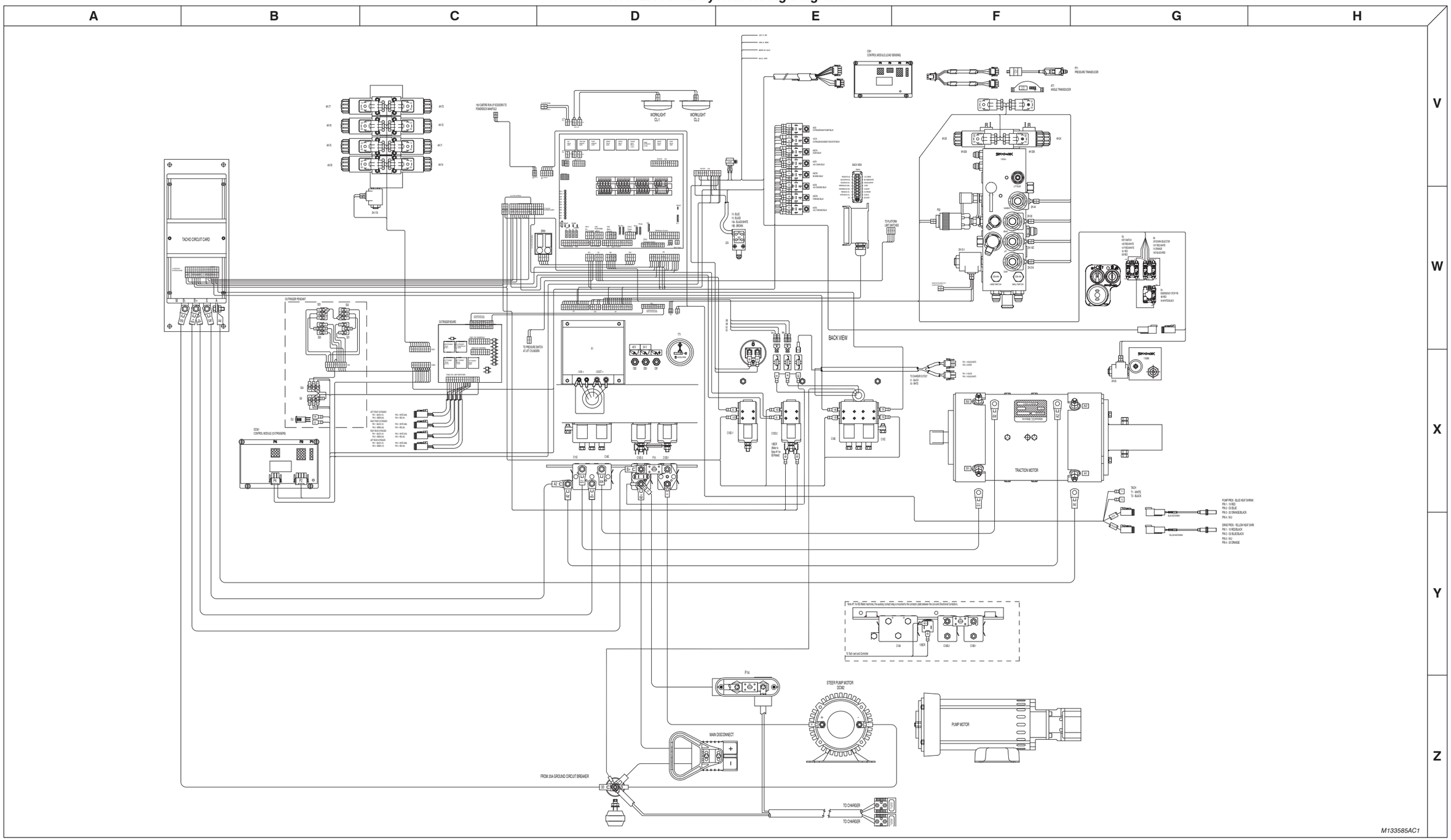
FOURTEEN PIN
CONNECTOR PLUG
PIN 1 - 02 WHITE - (TO BUTT SPLICE #1)
PIN 2 - 02 WHITE - (TO BUTT SPLICE #2)
PIN 3 - 23 BLACK/WHITE
PIN 4 - 2B PURPLE
PIN 5 - 24 BLUE/BLACK
PIN 6 - 14D BLACK
PIN 7 - 21A BROWN/RED
PIN 8 - 32A WHITE/RED
PIN 9 - 13 ORANGE - (TO MAIN MAINIFOLD)
PIN 10 - 30 BROWN
PIN 11 - 44 BLUE/RED
PIN 12 - 2A BLUE
PIN 13 - 25 ORANGE/GREEN
PIN 14 - 33A - ORANGE/BLACK

FIVE PIN
CONNECTOR PLUG
PIN 1 - 05 RED
PIN 2 - 04 WHITE/BLACK
PIN 3 - 10E RED/WHITE
PIN 4 - 13 ORANGE - (TO N.O. CONTACT BLOCK)
PIN 5 - 14E BLACK/RED

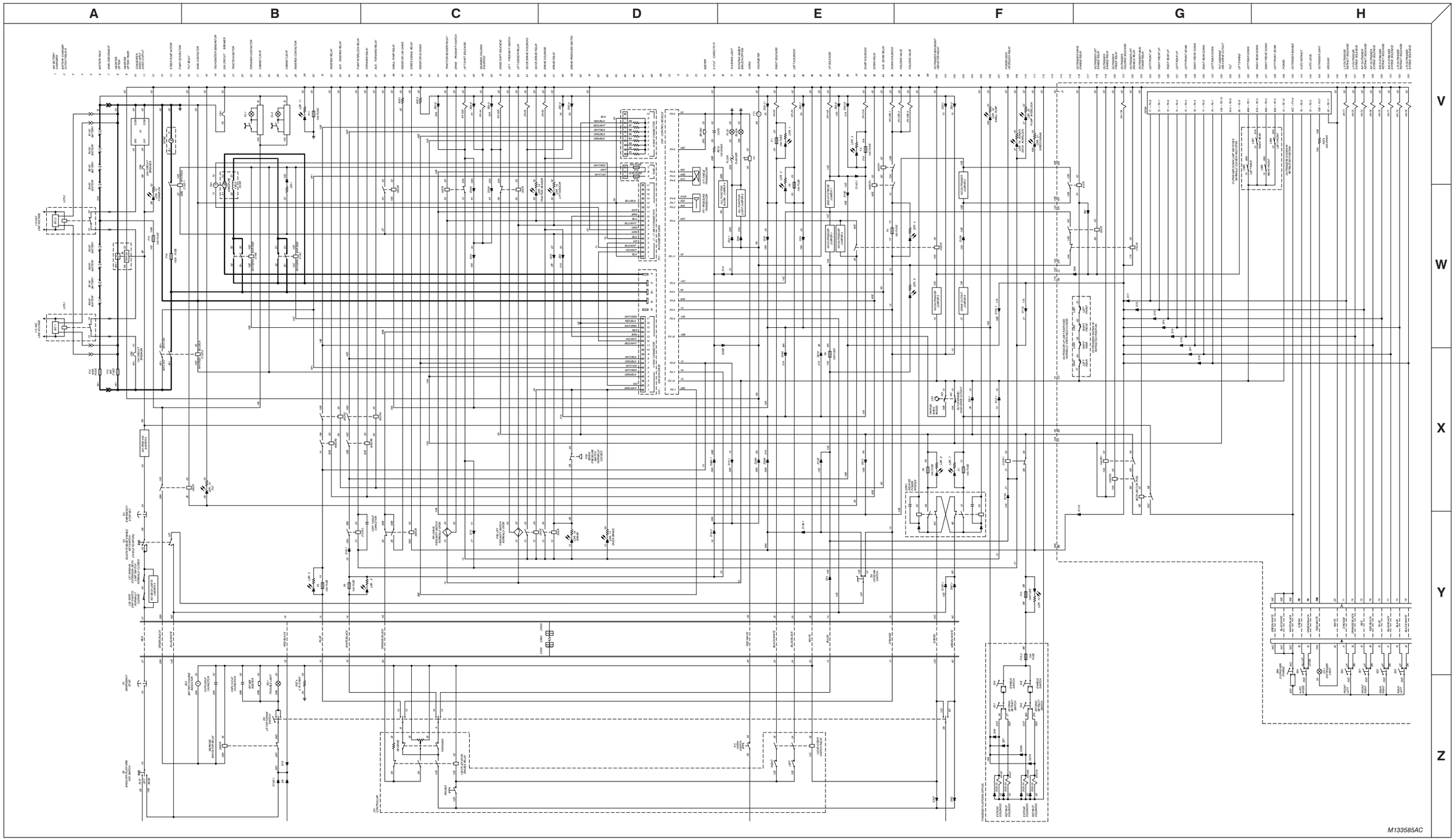
THREE PIN
CONNECTOR PLUG
PIN 1 - 10C RED/YELLOW
PIN 2 - 28 GREEN
PIN 3 - 02 WHITE - (TO BUTT SPLICE #3)



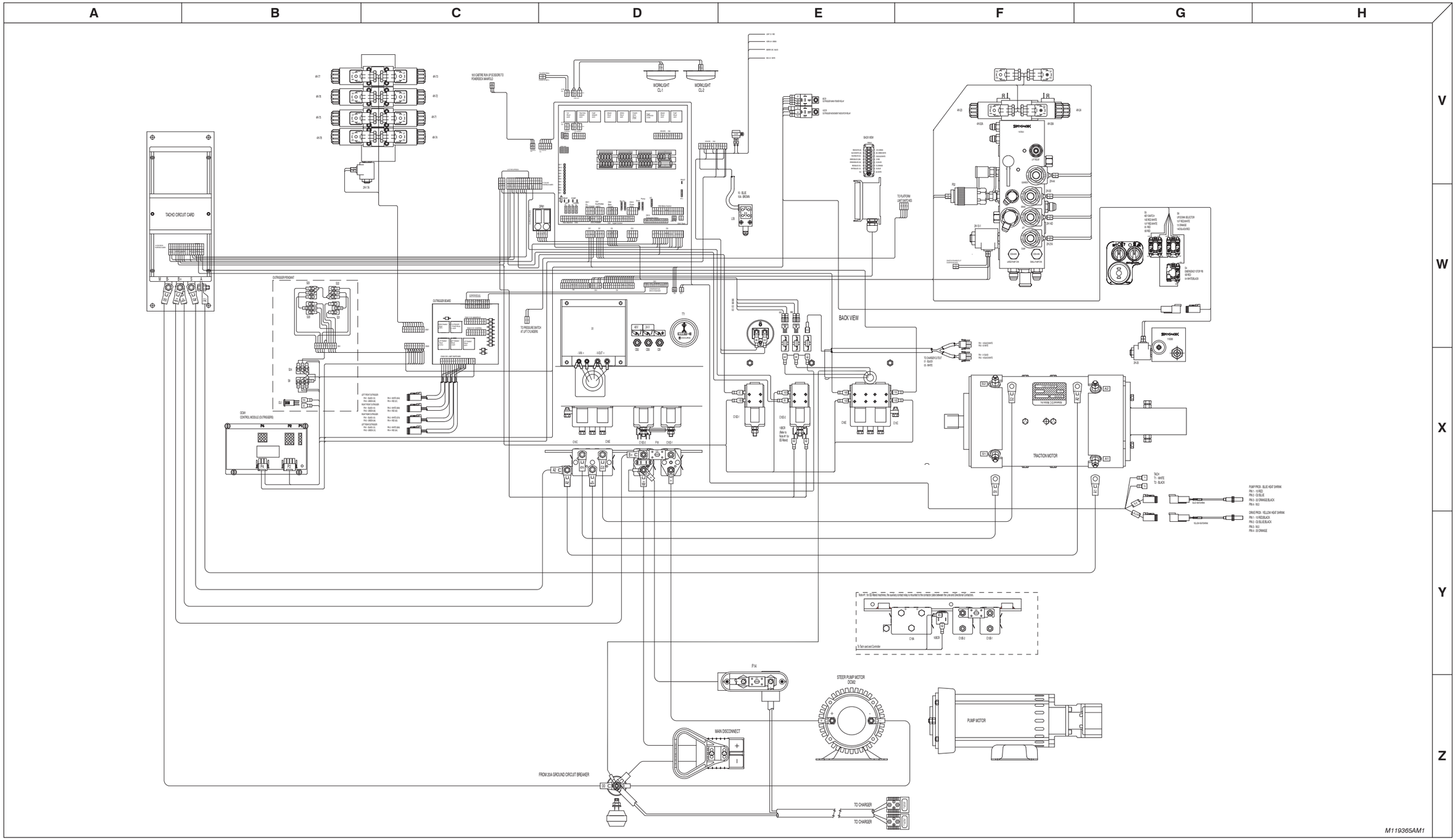
3.10 Electrical System Wiring Diagram



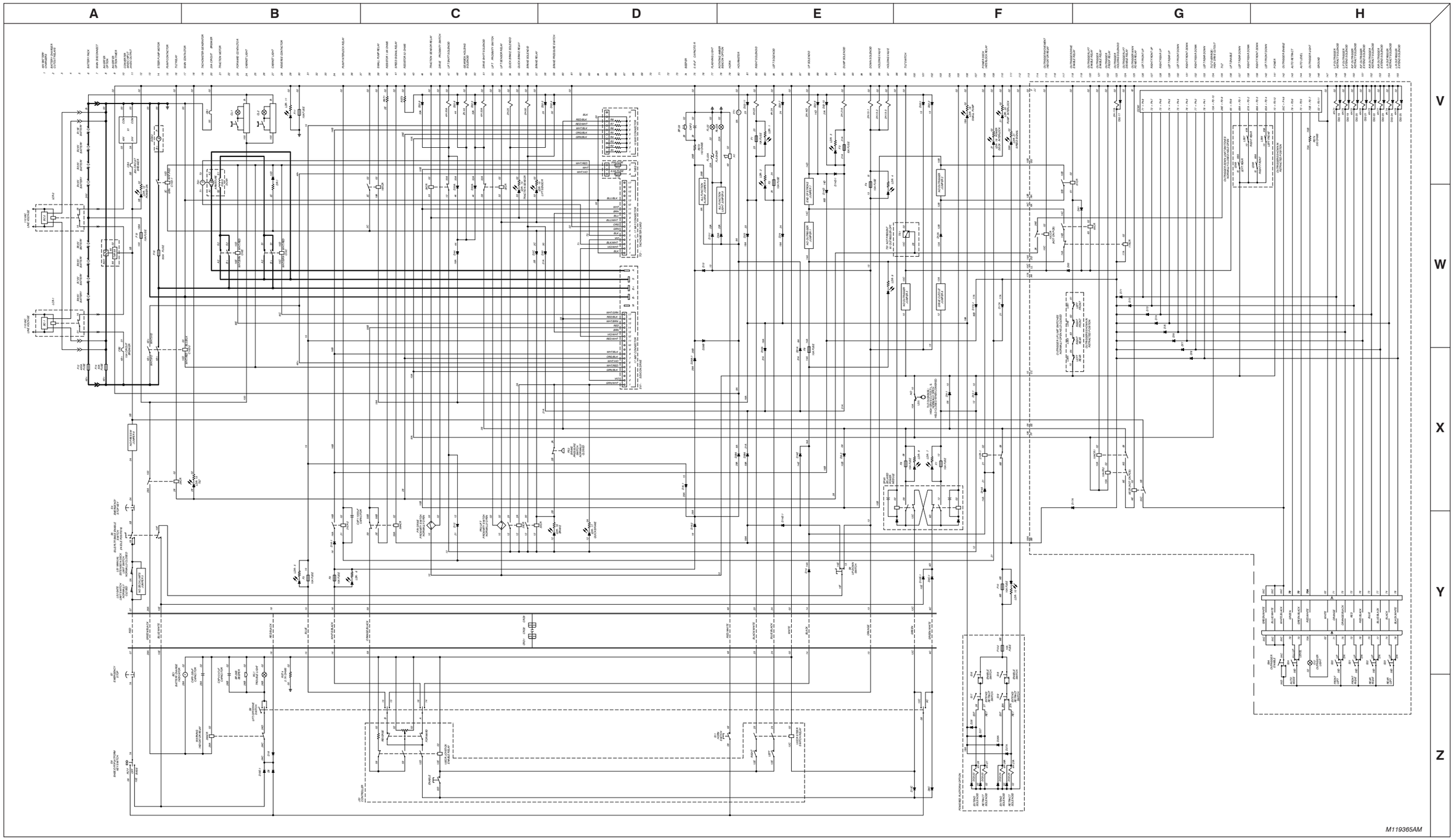
3.11 Electrical Schematic (CE)



3.12 Electrical System Wiring Diagram (ANSI/CSA)



3.13 Electrical Schematic (ANSI/CSA)



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TROUBLESHOOTING INFORMATION

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Introduction

The following pages contain a table of Troubleshooting Information for locating and correcting most service trouble which can develop. Careful and accurate analysis of the systems listed in the table of Troubleshooting Information will localize the trouble more quickly than any other method. This manual cannot cover all possible troubles and deficiencies that may occur. If a specific trouble is not listed, isolate the major component in which the trouble occurs, isolate whether the problem is electrical or hydraulic, and then isolate and correct the specific problem.

The content of this section is separated into “probable cause” and “remedy.” The information preceded by a number represents the “probable cause.” The following line, noted by a dash represents the “remedy” to the “probable cause” directly above it. See example below for clarification.

1. Probable Cause
   - Remedy

Electrical System

4.1-1. All Controls Inoperative

1. Batteries disconnected or discharged.
   - Connect batteries or recharge.
2. Battery charger plugged into an outside source.
   - Disconnect charger cord.
3. Dirty or loose battery terminals.
   - Clean and tighten terminals.
4. Main battery cables open or defective.
   - Check continuity. Replace if defective.
5. Main fuse F12 defective.
   - Replace fuse.
6. Defective battery charger relay LCR1 or LCR2.
   - Check relay. Replace if defective.
7. Defective or tripped circuit breaker CB2.
   - Reset circuit breaker. Replace if defective.
8. Loose or broken wire #01 from battery charger relay LCR1 to circuit breaker CB2.
   - Check continuity. Replace if defective.
9. Loose or broken wire #01A from battery charger relay LCR1 to battery charger relay LCR2.
   - Check continuity. Replace if defective.
10. Loose or broken wire #03 from battery charger relay LCR2 to converter.
    - Check continuity. Replace if defective.
11. Defective converter.
    - Check for 24 volts between wire #3A and #00, 48 volts between #03 and #00.
12. Defective contactor C10D-2.
    - Check contactor. Replace if defective.
13. Loose or broken wire #10D from contactor C10D-2 to motor control plug CN5.
    - Check continuity. Replace if defective.
14. Defective or tripped circuit breaker CB1.
    - Reset circuit breaker. Replace if defective.
15. Loose or broken wire #00 from circuit breaker CB1 to converter.
    - Check continuity. Replace if defective.
16. Defective or tripped circuit breaker CB3.
    - Reset circuit breaker. Replace if defective.
17. Loose or broken wire #3A from converter to circuit breaker CB3.
    - Check continuity. Replace if defective.
18. Loose or broken wire #3B from circuit breaker CB3 to (optional) pressure switch PS1.
    - Check continuity. Replace if defective.
19. Loose or broken wire #4 from (optional) pressure switch PS1 to base emergency stop switch S4.
    - Check continuity. Replace if defective.
20. Open or defective base emergency stop switch S4.
    - Close switch. Replace if defective.
21. Loose or broken wire #5B from base emergency stop switch S4 to base platform/base enable switch S5.
    - Check continuity. Replace if defective.
22. Defective base platform/base enable switch S5.
    - Check switch. Replace if defective.
23. Loose or broken wire #5 from base platform/base enable switch S5 to main circuit board at CN2.
    - Check continuity. Replace if defective.
24. Loose or broken wire #7 from main circuit board at CN1 to platform emergency stop switch S7.
    - Check continuity. Replace if defective.

Electrical System

25. Open or defective platform emergency stop switch S7.
    - Close switch. Replace if defective.
26. Loose or broken wire #7A from platform emergency stop switch S7 to platform base/platform selector switch S8.
    - Check continuity. Replace if defective.
27. Open or defective platform base/platform selector switch S8.
    - Close switch. Replace if defective.
28. Defective Sevcon.
    - See Sevcon troubleshooting Section 5.

4.1-2. All Controls Inoperative From Platform

1. Open or defective platform base/platform selector switch S8.
    - Select Platform with switch. Replace if defective.
2. Loose or broken wire #08 from platform base/platform selector switch S8 to lift/off/drive switch S9.
    - Check continuity. Replace if defective.
3. Open or defective lift/off/drive switch S9.
    - Close switch. Replace if defective.
4. Loose or broken wire #12D from diodes D9C and D12C to Joystick enable switch.
    - Check continuity. Replace if defective.
5. Defective Joystick Controller JS1.
    - Check Joystick. Replace if defective.

4.1-3. Base Controls Inoperative

1. Open or defective base platform/base enable switch S5.
    - Select Base with switch. Replace if defective.
2. Open or defective platform base/platform selector switch S8.
    - Select Base with switch. Replace if defective.
3. Loose or broken wire #10E from platform base/platform selector switch S8 to base platform/base enable switch S5.
    - Check continuity. Replace if defective.
4. Loose or broken wire #10F from base platform/base enable switch S5 to lift/lower switch S6 at base controls.
    - Check continuity. Replace if defective.
5. Defective lift/lower switch S6 at base controls.
    - Check switch. Replace if defective.

4.1-4. Up Circuit Inoperative From Platform (Machines without outriggers)

1. Open or defective lift/off/drive switch S9.
    - Select Lift. Replace if defective.
2. Loose or broken wire #9C from platform control box to main circuit board at CN1.
    - Check continuity. Replace if defective.
3. Open or defective diode D9C-1.
    - Check diode. Replace if defective.
4. Loose or broken wire #9D from main circuit board at CN12 to delayed power module.
    - Check continuity. Replace if defective.
5. Defective delayed power module.
    - Check for 24 volts between wire #09 and #02. Replace if defective.
6. Defective fuse F8.
    - Replace fuse.

Electrical System (Continued)

7. Open or defective diode D9-1 or D9-2.
   - Check diode. Replace if defective.
8. Loose or broken wire #14 from platform control box to main circuit board at CN1.
   - Check continuity. Replace if defective.
8. Open or defective diode D14.
   - Check diode. Replace if defective.
9. Defective fuse F9.
   - Replace fuse.
10. Loose or broken wire #14C from main circuit board at CN8 to end of stroke limit switch LS4.
   - Check continuity. Replace if defective.
11. Open or defective end of stroke limit switch LS4.
   - Check switch. Replace if defective.
12. Loose or broken wire #14D from end of stroke limit switch LS4 to main circuit board at CN8.
   - Check continuity. Replace if defective.
13. Loose or broken wire #14D or #02 from main circuit board at CN3 to up coil 2H-14D.
   - Check continuity. Replace if defective.
14. Open or defective diode D14D or D14D-1.
   - Check diode. Replace if defective.
15. Defective coil 2H-14D.
   - Check coil. Replace if defective.
16. Loose or broken wire #14C from main circuit board at CN8 to overload control module CM1. **(CE Only)**
   - Check continuity. Replace if defective.
17. Lift/Traction circuit not shifting.
   - See Lift/Traction Circuit inoperative.
18. Sevcon problem.
   - See Sevcon troubleshooting.
19. Overload sensing system problem. **(CE Only)**
   - Refer to Load Sensing Manual available online.

4.1-5. Up Circuit Inoperative From Base

1. Lift/Lower switch S6 defective.
   - Check continuity. Replace if defective.
2. Open or defective diode D14E or D14E-1.
   - Check diode. Replace if defective.

4.1-6 Up Circuit Inoperative from Platform or Base Controls with Outriggers Retracted (lift operates correctly with outriggers extended)

1. Outriggers not fully retracted.
   - Fully retract outrigger cylinders.
2. Loose or broken wire #10 from outrigger board to outrigger limit switch LS64.
   - Check continuity. Replace if defective.
3. Defective outrigger limit switch LS64.
   - Check switch. Replace if defective.
4. Loose or broken wire #64 from outrigger limit switch LS64 to outrigger board.
   - Check continuity. Replace if defective.
5. Loose or broken wire #64 from outrigger board to outrigger limit switch LS63.
   - Check continuity. Replace if defective.
6. Defective outrigger limit switch LS63.
   - Check continuity. Replace if defective.

Electrical System (Continued)

7. Loose or broken wire #63 from outrigger limit switch LS63 to outrigger board.
   - Check continuity. Replace if defective.
8. Loose or broken wire #63 from outrigger board to outrigger limit switch LS62.
   - Check continuity. Replace if defective.
9. Defective Limit switch LS62.
   - Check switch. Replace if defective.
10. Loose or broken wire #62 from outrigger limit switch LS62 to outrigger board.
    - Check continuity. Replace if defective.
11. Loose or broken wire #62 from outrigger board to outrigger limit switch LS61.
    - Check continuity. Replace if defective.
12. Defective outrigger limit switch LS61.
    - Check switch. Replace if defective.
13. Loose or broken wire #61 from outrigger limit switch LS61 to outrigger board .
    - Check continuity. Replace if defective.
14. Open diode D61 or D65 on outrigger board.
    - Check diode. Replace if defective.
15. Loose or broken wire #10C or #02 from outrigger board to relay 10CCR. **(ANSI/CSA only)**
    - Check continuity. Replace if defective.
16. Defective relay 10CCR. **(ANSI/CSA only)**
    - Check relay. Replace if defective.
17. Loose or broken wire #28E from outrigger control module to relay 10CCR. (ANSI/CSA only)
    - Check continuity. Replace if defective.
18. Loose or broken wire #28 from relay 10CCR to pin #7 on Sevcon. **(ANSI/CSA only)**
    - Check continuity. Replace if defective.

19. Loose or broken wire #28E from overload control module CM1 to pin #7 on Sevcon. **(CE only)**
    - Check continuity. Replace if defective.
20. Overload sensing system problem. **(CE Only)**
    - Refer to Load Sensing Manual available on line.

4.1-7 Up Circuit Inoperative from Platform or Base Controls with Outriggers Extended

1. Outriggers not extended enough.
   - Extend outriggers to take weight off tires (refer to operator section).
2. Loose or broken wire #10 from outrigger board to outrigger limit switch LS68.
   - Check continuity. Replace if defective.
3. Defective outrigger limit switch LS68.
   - Check switch. Replace if defective.
4. Loose or broken wire #68A from outrigger limit switch LS68 to outrigger control module at pin P2-1.
   - Check continuity. Replace if defective.
5. Loose or broken wire #10 from outrigger board to outrigger limit switch LS67.
   - Check continuity. Replace if defective.
6. Defective outrigger limit switch LS67.
   - Check switch. Replace if defective.
7. Loose or broken wire #67A from outrigger limit switch LS67 to outrigger control module at pin P2-2.
   - Check continuity. Replace if defective.
8. Loose or broken wire #10 from outrigger board to outrigger limit switch LS66.
   - Check continuity. Replace if defective.
9. Defective outrigger limit switch LS66.
   - Check switch. Replace if defective.

Electrical System (Continued)

10. Loose or broken wire #66A from outrigger limit switch LS66 to outrigger control module at pin P2-3.
    - Check continuity. Replace if defective.
11. Loose or broken wire #10 from outrigger board to outrigger limit switch LS65.
    - Check continuity. Replace if defective.
12. Defective outrigger limit switch LS65.
    - Check switch. Replace if defective.
13. Loose or broken wire #65A from outrigger limit switch LS65 to outrigger control module at pin P2-4.
    - Check continuity. Replace if defective.
14. Check for power on wire #65 at outrigger control module at pin P2-8.
    - If no voltage present, proceed to outrigger control module troubleshooting.
15. Loose or broken wire #65 from outrigger control module at pin P2-8 to outrigger board CN22 pin #16.
    - Check continuity. Replace if defective.
16. Defective lift enable relay 65CR.
    - Check relay. Replace if defective.
17. Defective lift disable relay 17ACR.
    - Check relay. Replace if defective.
18. Open diode D65 on outrigger board.
    - Check diode. Replace if defective.
19. Loose or broken wire #10C or #02 from outrigger board to relay 10CCR. **(ANSI/CSA only)**
    - Check continuity. Replace if defective.
20. Defective relay 10CCR. **(ANSI/CSA only)**
    - Check relay. Replace if defective.
21. Loose or broken wire #28E from outrigger control module to relay 10CCR. **(ANSI/CSA only)**
    - Check continuity. Replace if defective.
22. Loose or broken wire #28 from relay 10CCR to pin #7 on Sevcon. **(ANSI/CSA only)**
    - Check continuity. Replace if defective.
23. Loose or broken wire #28E from overload control module CM1 to pin #7 on Sevcon. **(CE only)**
    - Check continuity. Replace if defective.
24. Overload sensing system problem. **(CE Only)**
    - Refer to Load Sensing Manual available on line.

4.1-8 Down Circuit Inoperative from Platform

1. Open or defective lift/off/drive switch S9.
    - Select Lift. Replace if defective.
2. Loose or broken wire #9C from platform control box to main circuit board at CN1.
    - Check continuity. Replace if defective.
3. Open or defective diode D9C-1.
    - Check diode. Replace if defective.
4. Loose or broken wire #9D from main circuit board at CN12 to delayed power module.
    - Check continuity. Replace if defective.
5. Defective delayed power module.
    - Check for 24 volts between wire #09 and #02. Replace if defective.
6. Defective fuse F8.
    - Replace fuse.
7. Open or defective diode D9-1 or D9-2.
    - Check diode. Replace if defective.
8. Loose or broken wire #13 from platform control box to main circuit board at CN1.
    - Check continuity. Replace if defective.

Electrical System (Continued)

9. Defective fuse F4.
   - Replace fuse.
10. Loose or broken wire #13 or #02 from main circuit board at CN3 to down coil 2H-13-1, and holding valve coil 2H-13-2 and 2H-13-3. **(ANSI/CSA only)**
   - Check continuity. Replace if defective.
11. Defective Down coil 2H-13-1, or holding valve coil 2H-13-2 and 2H-13-3. **(ANSI/CSA only)**
   - Check coil. Replace if defective.
12. Loose or broken wire #02 from main circuit board to down enable relay 60ECR1 or auxiliary down enable relay 60CR1. **(CE only)**
   - Check continuity. Replace if defective.
13. Defective down enable relay 60ECR1 or auxiliary down enable relay 60CR1. **(CE only)**
   - Check relay. Replace if defective.
14. Loose or broken wire #60E from control module CM1 at pin #P3-6 to down enable relay 60ECR1. **(CE only)**
   - Check continuity. Replace if defective.
15. Loose or broken wire #60 from control module CM1 at pin #P3-4 to auxiliary down enable relay 60CR1. **(CE only)**
   - Check continuity. Replace if defective.
16. Loose or broken wire #13 from main circuit board at CN8 to down enable relay 60ECR1. **(CE only)**
   - Check continuity. Replace if defective.
17. Loose or broken wire #13A from down enable relay 60ECR1 to auxiliary down enable relay 60CR1. **(CE only)**
   - Check continuity. Replace if defective.
18. Loose or broken wire #13B or #02 from auxiliary down enable relay 60CR1 to down coil 2H-13B-1, and holding valve coil 2H-13B-2 and 2H-13B-3. **(CE only)**
   - Check continuity. Replace if defective.
19. Defective down coil 2H-13B-1, or holding valve coil 2H-13B-2 and 2H-13B-3. **(CE only)**
   - Check coil. Replace if defective.
20. Lift/Traction circuit not shifting.
   - See lift/traction circuit inoperative.
21. Sevcon problem.
   - See Sevcon troubleshooting.
22. Overload sensing system problem. (CE Only)
   - Refer to Load Sensing Manual available on line.

4.1-9. Down Circuit Inoperative from Base

1. Lift/Lower switch S6 defective.
   - Check continuity. Replace if defective.
2. Loose or broken wire #13 on lift/lower switch S6 to main circuit board at CN2.
   - Check continuity. Replace if defective.

4.1-10. Platform Does Not Steer Left Or Right

1. Defective relay 18ACR.
   - Check relay. Replace if defective.
2. Loose or broken wire #12C from lift/off/drive switch S9 to steer enable relay 12CCR.
   - Check continuity. Replace if defective.
3. Defective steer toggle switch.
   - Check switch. Replace if defective.
4. Open or defective diode D18A.
   - Check diode. Replace if defective.

Electrical System (Continued)

4.1-11. No Steer Right

1. Loose or broken wire #23 from platform control box to main circuit board at CN1.
   - Check continuity. Replace if defective.
2. Open or defective diode D23.
   - Check diode. Replace if defective.
3. Defective fuse F1.
   - Replace fuse.
4. Loose or broken wire #23 or #02 on coil 4H-23.
   - Check continuity. Replace if defective.
5. Defective coil 4H-23.
   - Check coil. Replace if defective.
6. Defective steer switch.
   - Check switch. Replace if defective.

4.1-12. No Steer Left

1. Loose or broken wire #24 from platform control box to main circuit board at CN1.
   - Check continuity. Replace if defective.
2. Open or defective diode D24.
   - Check diode. Replace if defective.
3. Defective fuse F2.
   - Replace fuse.
4. Loose or broken wire #24 or #02 on coil 4H-24.
   - Check continuity. Replace if defective.
5. Defective coil 4H-24.
   - Check coil. Replace if defective.
6. Defective steer switch.
   - Check switch. Replace if defective.

4.1-13. Forward And Reverse Drive Inoperative (Machines without outriggers)

1. Open or defective lift/off/drive switch S9.
   - Select Lift. Replace if defective.
2. Loose or broken wire #12C from platform control box to main circuit board at CN1.
   - Check continuity. Replace if defective.
3. Loose or broken wire #12C from main circuit board at CN12 to delayed power module.
   - Check continuity. Replace if defective.
4. Defective delayed power module.
   - Check for 24 volts between wire #09 and #02. Replace if defective.
5. Defective fuse F7.
   - Replace fuse.
6. Open or defective diode D12-1 or D12A.
   - Check diode. Replace if defective.
7. Open or defective diode D12C.
   - Check diode. Replace if defective.
8. Brake not releasing.
   - See brake not releasing troubleshooting in this section.
8. Lift/Traction circuit not shifting.
   - See lift/traction circuit inoperative.
9. Sevcon problem.
   - See Sevcon troubleshooting.

Electrical System (Continued)

4.1-14. Forward And Reverse Drive Inoperative (Machines with outriggers)

1. Outriggers not fully retracted
   - Fully retract outrigger cylinders
2. Open or defective lift/off/drive switch S9.
   - Select Lift. Replace if defective.
3. Loose or broken wire #12C from platform control box to main circuit board at CN1.
   - Check continuity. Replace if defective.
4. Loose or broken wire #12C from main circuit board at CN12 to delayed power module.
   - Check continuity. Replace if defective.
5. Defective delayed power module.
   - Check for 24 volts between wire #09 and #02. Replace if defective.
6. Defective fuse F7.
   - Replace fuse.
7. Open or defective diode D12-1 or D12A.
   - Check diode. Replace if defective.
8. Open or defective diode D12C.
   - Check diode. Replace if defective.
9. Loose or broken wire #10 from outrigger board to outrigger limit switch LS64.
   - Check continuity. Replace if defective.
10. Defective outrigger limit switch LS64.
    - Check switch. Replace if defective.
11. Loose or broken wire #64 from outrigger limit switch LS64 to outrigger board.
    - Check continuity. Replace if defective.
12. Loose or broken wire #64 from outrigger board to outrigger limit switch LS63.
    - Check continuity. Replace if defective.
13. Defective outrigger limit switch LS63.
    - Check continuity. Replace if defective.
14. Loose or broken wire #63 from outrigger limit switch LS63 to outrigger board.
    - Check continuity. Replace if defective.
15. Loose or broken wire #63 from outrigger board to outrigger limit switch LS62.
    - Check continuity. Replace if defective.
16. Defective Limit switch LS62.
    - Check switch. Replace if defective.
17. Loose or broken wire #62 from outrigger limit switch LS62 to outrigger board.
    - Check continuity. Replace if defective.
18. Loose or broken wire #62 from outrigger board to outrigger limit switch LS61.
    - Check continuity. Replace if defective.
19. Defective outrigger limit switch LS61.
    - Check switch. Replace if defective.
20. Loose or broken wire #61 from outrigger limit switch LS61 to outrigger board.
    - Check continuity. Replace if defective.
21. Open diode D61 or D65 on outrigger board.
    - Check diode. Replace if defective.
22. Loose or broken wire #10C or #02 from outrigger board to relay 10CCR. **(ANSI/CSA only)**
    - Check continuity. Replace if defective.

24. Defective relay 10CCR. **(ANSI/CSA only)**
    - Check relay. Replace if defective.
25. Loose or broken wire #28E from outrigger control module to relay 10CCR. **(ANSI/CSA only)**
    - Check continuity. Replace if defective.

Electrical System (Continued)

26. Loose or broken wire #28 from relay 10CCR to pin #7 on Sevcon. **(ANSI/CSA only)**
    - Check continuity. Replace if defective.
27. Loose or broken wire #28E from overload control module CM1 to pin #7 on Sevcon. **(CE only)**
    - Check continuity. Replace if defective.
28. Overload sensing system problem. **(CE Only)**
    - Refer to Load Sensing Manual available on line.
29. Brake not releasing.
    - See brake not releasing troubleshooting in this section.
30. Lift/Traction circuit not shifting.
    - See Lift/Traction Circuit inoperative.
31. Sevcon problem.
    - See Sevcon troubleshooting.

4.1-15. Forward Drive Inoperative

1. Loose or broken wire #16 on lift/off/drive switch S9.
    - Check continuity. Replace if defective.
2. Defective fuse F6.
    - Replace fuse.
3. Open or defective diode D16-1.
    - Check diode. Replace if defective.
4. Defective relay 21CR2.
    - Check relay. Replace if defective.
5. Loose or broken wire #16B from main circuit board at CN5 to pin #8 on Sevcon. **(ANSI/CSA only)**
    - Check continuity. Replace if defective.
6. Bad contacts in contactor C16E.
    - Replace contactor.
7. Loose or broken wire #16E from pin #15 on Sevcon to contactor C16E.
    - Check continuity. Replace if defective.
8. Loose or broken wire #02 from main circuit board to forward relay 60ECR3 or auxiliary forward relay 60CR3. **(CE only)**
    - Check continuity. Replace if defective.
9. Defective forward relay 60ECR3 or auxiliary forward relay 60CR3. **(CE only)**
    - Check relay. Replace if defective.
10. Loose or broken wire #60E from control module CM1 at pin #P3-6 to forward relay 60ECR3. **(CE only)**
    - Check continuity. Replace if defective.
11. Loose or broken wire #60 from control module CM1 at pin #P3-4 to auxiliary forward relay 60CR3. **(CE only)**
    - Check continuity. Replace if defective.
12. Loose or broken wire #16B from main circuit board at CN5 to forward relay 60ECR3. **(CE only)**
    - Check continuity. Replace if defective.
13. Loose or broken wire #16C from forward relay 60ECR3 to auxiliary forward relay 60CR3. **(CE only)**
    - Check continuity. Replace if defective.
14. Loose or broken wire #16D from auxiliary forward relay 60CR3 to pin #8 on Sevcon. **(CE only)**
    - Check continuity. Replace if defective.

4.1-16. Reverse Drive Inoperative

1. Loose or broken wire #15 on lift/off/drive switch S9.
    - Check continuity. Replace if defective.

Electrical System (Continued)

2. Defective fuse F5.
   - Replace fuse.
3. Loose or broken wire #15 from main circuit board at CN5 to pin #11 on Sevcon. **(ANSI/CSA only)**
   - Check continuity. Replace if defective.
4. Bad contacts in contactor C15C.
   - Replace contactor.
5. Loose or broken wire #15C from pin #17 on Sevcon to contactor C15C.
   - Check continuity. Replace if defective.
6. Loose or broken wire #02 from main circuit board to reverse relay 60ECR2 or auxiliary reverse relay 60CR2. **(CE only)**
   - Check continuity. Replace if defective.
7. Defective reverse relay 60ECR2 or auxiliary reverse relay 60CR2. **(CE only)**
   - Check relay. Replace if defective.
8. Loose or broken wire #60E from control module CM1 at pin #P3-6 to reverse relay 60ECR2. **(CE only)**
   - Check continuity. Replace if defective.
9. Loose or broken wire #60 from control module CM1 at pin #P3-4 to auxiliary reverse relay 60CR2. **(CE only)**
   - Check continuity. Replace if defective.
10. Loose or broken wire #15 from main circuit board at CN5 to reverse relay 60ECR2. **(CE only)**
    - Check continuity. Replace if defective.
11. Loose or broken wire #15A from reverse relay 60ECR2 to auxiliary reverse relay 60CR2. **(CE only)**
    - Check continuity. Replace if defective.
12. Loose or broken wire #15B from auxiliary reverse relay 60CR2 to pin #11 on Sevcon. **(CE only)**
    - Check continuity. Replace if defective.

4.1-17. Forward And Reverse Slow Speed Only

1. Loose or broken wire #10 from main circuit board at CN8 to high drive cut out limit switch LS5.
   - Check continuity. Replace if defective.
2. High drive cut out limit switch LS5 out of adjustment, open or defective.
   - Adjust switch. Check switch. Replace if defective.
3. Loose or broken wire #10A from high drive cut out limit switch LS5 to main circuit board at CN8.
   - Check continuity. Replace if defective.
4. Loose or broken wire #10A from main circuit board at CN5 to pin #4 on Sevcon.
   - Check continuity. Replace if defective.
5. Loose or broken wire #28 **(ANSI/CSA)**, or #28E **(CE)** at pin #7 on Sevcon.
   - Check for 24 volts at pin #7. If no voltage present see Sevcon troubleshooting.

4.1-18. Brake Not Releasing

1. Open or defective brake relay 30CR or quick brake relay 25CR.
   - Check relay. Replace if defective.
2. Loose or broken wire #2A or #2B on Brake pressure switch PS2.
   - Check continuity. Replace if defective.
3. Open or defective brake pressure switch PS2.
   - Check for continuity between wire #2A and #2B on Brake pressure switch (PS2). Replace if defective.
4. Loose or broken wire #30 or #02 on coil 2H-30.
   - Check continuity. Replace if defective.
5. Defective coil 2H-30.
   - Check coil. Replace if defective.

Electrical System (Continued)

6. Loose or broken wire #25 or #02 on coil 2H-25.
   - Check continuity. Replace if defective.
7. Defective coil 2H-25.
   - Check coil. Replace if defective.
8. Open or defective diode D30.
   - Check diode. Replace if defective.
9. Loose or broken wire #2A from pin #1 on Sevcon to relay 25CR.
   - Check continuity. Replace if defective.

4.1-19. Lift/Traction Shift Circuit Inoperative

1. Defective proximity switch PR1 or PR2.
   - Refer to proximity switch test procedure Section 5.
2. Open or defective diode D44.
   - Check diode. Replace if defective.
3. Loose or broken wire #44 or #02 on coil 2H-44.
   - Check continuity. Replace if defective.
4. Defective coil 2H-44.
   - Check coil. Replace if defective.
5. Defective traction sensor relay 33CR, or lift sensor relay 32CR.
   - Check relay. Replace if defective.
6. Loose or broken wire #32A or #02 on coil 4H-32A.
   - Check continuity. Replace if defective.
7. Defective coil 4H-33A.
   - Check coil. Replace if defective.
8. Loose or broken wire #33A or #02 on coil 4H-33A.
   - Check continuity. Replace if defective.
9. Defective coil 4H-33A.
   - Check coil. Replace if defective.
10. Open or defective diode D33A or D32A.
    - Check diode. Replace if defective.
11. Loose or broken wire #32 from lift sensor relay 32CR to pin #8 on tachometer board.
    - Check continuity. Replace if defective.
12. Loose or broken wire #33 from traction sensor relay 33CR to pin #9 on tachometer board.
    - Check continuity. Replace if defective.

4.1-20. Powered Extension Deck Inoperative

1. Open or defective pump interlock relay 21CR-1.
   - Check relay. Replace if defective.
2. Defective fuse F10.
   - Replace fuse.
3. Defective fuse F10-2.
   - Replace fuse.
4. Loose or broken wire #9B from terminal block to enable switch S16 or S18.
   - Check continuity. Replace if defective.
5. Open or defective enable switch S16 or S18.
   - Close switch. Check switch. Replace if defective.
6. Loose or broken wire #9B from enable switch S16 or S18 to in/out switch S17 or S19.
   - Check continuity. Replace if defective.

Electrical System (Continued)

7. Loose or broken wire #18A from terminal block to small pump relay 18ACR.
   - Check continuity. Replace if defective.
8. Loose or broken wire #26 on switch S17 or wire #26A on switch S19.
   - Check continuity. Replace if defective.
9. Loose or broken wire #26 or #02 on coil 4H-26 or wire #26A or #02 on coil 4H-26A.
   - Check continuity. Replace if defective.
10. Defective coil 4H-26 or 4H-26A.
    - Check coil. Replace if defective.
11. Open or defective diode D26 or D26A.
    - Check diode. Replace if defective.
12. Loose or broken wire #27 on switch S17 or wire #27A on switch S19.
    - Check continuity. Replace if defective.
13. Loose or broken wire #27 or #02 on coil 4H-27 or wire #27A or #02 on coil 4H-27A.
    - Check continuity. Replace if defective.
14. Defective coil 4H-27 or 4H-27A.
    - Check coil. Replace if defective.
15. Open or defective diode D27 or D27A.
    - Check diode. Replace if defective.

4.1-21 All Outriggers Inoperative (Auto-level and manual)

WARNING

Scissors lift must be below high speed limit switch for outriggers to function.

NOTE

For the outriggers to function the upper control console must be in the lift position.

1. No power at wire #10A on connector CN14 on outrigger board.
   - If no power is present check the close couple connection to main circuit board. Replace if defective.
2. No power at wire #9 on connector CN14 on outrigger board.
   - If no power is present check the close couple connection to main circuit board. Replace if defective.
3. Defective relay 10ACR1 or 10ACR2 on outrigger board.
   - Check relays. Replace if defective.
4. Loose or broken wire #9E from outrigger board to relay 9ECR.
   - Check for continuity. Replace if defective.
5. Loose or broken wire #02 from main circuit board to relay 9ECR.
   - Check continuity. Replace if defective.
6. Defective relay 9ECR.
   - Check relay. Replace if defective.
7. Loose or broken wire #3B from circuit breaker CB3 to relay 9ECR.
   - Check for continuity. Replace if defective.
8. Loose or broken wire #35C from relay 9ECR to outrigger circuit board.
   - Check continuity. Replace if defective.
9. Open diode D17A or D17A-1 on outrigger board.
   - Check diode. Replace if defective.

Electrical System (Continued)

10. Loose or broken wire #17A from pin #1 or wire #02 from pin #2 on connector CN21 on outrigger board to outrigger holding valve coil 2H-17A.
    - Check for continuity. Replace if defective.
11. Defective outrigger holding valve coil 2H-17A.
    - Check coil. Replace if defective.

4.1-22 All Outriggers Inoperative (Auto-level and manual from platform controls)

1. Loose or broken wire #35C from connector CN20 on outrigger board through outrigger cables and plugs to the outrigger enable switch S9A in the control console.
    - Check for continuity. Replace if defective.
2. Loose or broken wire #35D from outrigger enable switch S9A to pin #5 on the outrigger control console plug.
    - Check for continuity. Replace if defective.
3. Defective outrigger enable switch S9A.
    - Check switch. Replace if defective.

4.1-23 All Outriggers Inoperative (Auto-level)

A: Led Power Indicator Light at Outrigger Control Module (OCM1) Not on Constant

1. Loose or broken wire #10 from outrigger board to pin P2-12 on the outrigger control module OCM1.
    - Check for continuity. Replace if defective.
2. Loose or broken wire #02 from outrigger board to pin P2-11 on the outrigger control module OCM1.
    - Check for continuity. Replace if defective.
3. Defective outrigger control module OCM1.
    - Replace.

Electrical System (Continued)

4.1-24 All Outriggers Inoperative (Auto Level Only)
B: Led Power Indicator Light at Outrigger Control Module (OCM1) Flashing

NOTE: A Steady Light on Sevcon Means System is Ready to Operate.

FLASH CODE	TROUBLE	PROBABLE CAUSE	REMEDY
LED is off	No functions	1. Batteries Disconnected. 2. Defective Sevcon.	1. Reconnect batteries. 2. Replace Sevcon.
2 Flash Fault	Procedure Fault	1. Lift or Drive Selected Before Power up.	1. First Power Up and then Select Function.
3 Flash Fault		1. Sevcon Shorted. 2. Drive Motor Shorted.	1. Replace Sevcon. 2. Replace Drive Motor.
4 Flash Fault		1. Contactor welded.	1. Replace Contactor.
5 Flash Fault		1. Contactor not shifted. 2. Defective Sevcon.	1. Clean Contactor. Replace if defective. 2. Replace Sevcon.
6 Flash Fault	No Drive and Lift	1. Loose or broken wire #59 from upper control box to Pin #14 on Sevcon. 2. Open or defective Base Speed Relay (59ACR).	1. Check continuity. Replace if defective. 2. Check Relay. Replace if defective.
7 Flash Fault	Low Battery Voltage	1. Batteries have dropped below 13 Volts.	1. Recharge Batteries.
8 Flash Fault	Thermal Cutback	1. Sevcon Overheating.	1. Let unit cool down.
10 Flash Fault		1. Loose or broken wire from Pin #2 on Sevcon to Pin #4 on Tachometer Board. 2. Loose or broken wire from Pin #12 on Sevcon to Pin #2 on Tachometer Board. 3. Loose or broken wire #T1 or #T2 from Tachometer Generator to Main Circuit Board.	1. Check continuity. Replace if defective. 2. Check continuity. Replace if defective. 3. Check continuity. Replace if defective.
11 Flash Fault	Tachometer Fault	1. Tachometer Generator defective. 2. Tachometer Generator Wires Reversed. 3. Defective Tachometer Board.	1. Check output 20.8 Volts per 1000 RPM. Replace if defective. 2. Switch wires at Generator. 3. Check Tachometer Board for inputs and outputs. Replace if defective.
12 Flash Fault	Tilt Condition with Platform Elevated.	1. Tilt Condition with Platform Elevated has disabled Sevcon for Lift and Drive.	1. Lower Platform and Reposition to a firm Level Surface.
13 Flash Fault	Transmission Gear Mesh Failure	1. Incorrectly set Proximity Switch. 2. Defective Proximity Switch.	1. Refer to Proximity Switch Adjustment Procedure (Section 5, Page 11) 2. Refer to Proximity Switch Test Procedure (Section 5, Page 12)
14 Flash Fault	Low or Open Voltage to Sevcon	1. Loose or broken wire to Pin #5 on Sevcon. 2. Loose or broken wire to Pin #6 on Sevcon.	1. Check for 24 Volts between Pin #5 and wire #02. 2. Check for 48 Volts between Pin #6 and wire #02.

60311AA

Electrical System (Continued)

4.1-25 Left Front Outrigger Inoperative Manually

1. Defective left front outrigger switch S20 at platform.
   - Check switch. Replace if defective.
2. Loose or broken wire #71 from outrigger control console to pin #6 on connector CN20 at outrigger board (retract), or from wire #75 to pin #7 (extend).
   - Check continuity. Replace if defective.
3. Open diode D71 (retract) or D75 (extend) on outrigger board.
   - Check diode. Replace if defective.
4. Loose or broken wire #71 from pin #7 on connector CN21 at outrigger board to valve coil 4H-71 (retract) , or wire #75 from pin #8 to 4H-75 (extend).
   - Check continuity. Replace if defective.
5. Loose or broken wire #02 from valve coil 4H-71 (retract) or 4H-75 (extend) to pin #2 on connector CN21 at the outrigger board.
   - Check continuity. Replace if defective.

4.1-26 Right Front Outrigger Inoperative Manually

1. Defective right front outrigger switch S21 at platform.
   - Check switch. Replace if defective.
2. Loose or broken wire #72 from outrigger control console to pin #8 on connector CN20 at outrigger board (retract), or from wire #76 to pin #9 (extend).
   - Check continuity. Replace if defective.
3. Open diode D72 (retract) or D76 (extend) on outrigger board.
   - Check diode. Replace if defective.
4. Loose or broken wire #72 from pin #9 on connector CN21 at outrigger board to valve coil 4H-72 (retract), or wire #76 from pin #10 to 4H-76 (extend).
   - Check continuity. Replace if defective.
5. Loose or broken wire #02 from valve coil 4H-72 (retract) or 4H-76 (extend) to pin #2 on connector CN21 at the outrigger board.
   - Check continuity. Replace if defective.

4.1-27 Right Rear Outriggers Inoperative Manually

1. Defective right rear outrigger switch S22 at platform.
   - Check switch. Replace if defective.
2. Loose or broken wire #73 from outrigger control console to pin #3 on connector CN20 at outrigger board (retract), or from wire #77 to pin #4 (extend).
   - Check continuity. Replace if defective.
3. Open diode D73 (retract) or D77 (extend) on outrigger board.
   - Check diode. Replace if defective.
4. Loose or broken wire #73 from pin #4 on connector CN21 at outrigger board to valve coil 4H-73 (retract), or wire #77 from pin #4 to 4H-77 (extend).
   - Check continuity. Replace if defective.
5. Loose or broken wire #02 from valve coil 4H-73 (retract) or 4H-77 (extend) to pin #2 on connector CN21 at the outrigger board.
   - Check continuity. Replace if defective.

Electrical System (Continued)

4.1-28 Left Rear Outriggers Inoperative Manually

1. Defective left rear outrigger switch S23 at platform.
   - Check switch. Replace if defective.
2. Loose or broken wire #74 from outrigger control console to pin #5 on connector CN20 at outrigger board (retract), or from wire #78 to pin #2 (extend).
   - Check continuity. Replace if defective.
3. Open diode D74 (retract) or D78 (extend) on outrigger board.
   - Check diode. Replace if defective.
4. Loose or broken wire #74 from pin #6 on connector CN21 at outrigger board to valve coil 4H-74 (retract), or wire #78 from pin #3 to 4H-78 (extend).
   - Check continuity. Replace if defective.
5. Loose or broken wire #02 from valve coil 4H-74 (retract) or 4H-78 (extend) to pin #2 on connector CN21 at the outrigger board.
   - Check continuity. Replace if defective.

4.1-29 Individual Outrigger Functions Inoperative (auto-level)

1. Loose or broken wire #71- #75 (depending on function not working) at pins 1-8 of outrigger control module plug P4.
   - Check connections of outrigger functions not working (refer to Section 5 for pin reference chart). Replace if defective.
2. No output from outrigger control module OCM1 at pins 1-8 of outrigger control module plug P4.
   - Turn off power to reset the outrigger control module. Turn power back on and retest. If problem persists, replace outrigger control module.

4.1-30 Auto-level Inoperative

1. Loose or broken wire #35D from outrigger enable switch S9A to auto mode outrigger switch S24.
   - Check continuity. Replace if defective.
2. Defective auto mode outrigger switch S24.
   - Check switch. Replace if defective.
3. Loose or broken wire #10 at pin #P2-12 on outrigger control module OCM1.
   - Check for power at P2-12. If no voltage present, check continuity of wire. Replace if defective.
4. Loose or broken wire #10A at pin #P2-10 on outrigger control module OCM1.
   - Check for power at P2-10. If no voltage present, check continuity of wire. Replace if defective.
5. Loose or broken wire #02 at pin #P2-11 on outrigger control module OCM1.
   - Check for ground at P2-11. If no ground present, check continuity of wire. Replace if defective.
6. Loose or broken wire #70 from auto mode outrigger switch S24 to pin #P2-5 on outrigger control module OCM1.
   - Check continuity. Replace if defective.

Electrical System (Continued)

4.1-31 Auto All Up Inoperative (Retract)

1. Loose or broken wire #35D from outrigger enable switch S9A to auto mode outrigger switch S24.
   - Check continuity. Replace if defective.
2. Defective auto mode outrigger switch S24.
   - Check switch. Replace if defective.
3. Loose or broken wire #10 at pin #P2-12 on outrigger control module OCM1.
   - Check for power at P2-12. If no voltage present, check continuity of wire. Replace if defective.
4. Loose or broken wire #10A at pin #P2-12 on outrigger control module OCM1.
   - Check for power at P2-10. If no voltage present, check continuity of wire. Replace if defective.
5. Loose or broken wire #02 at pin #P2-11 on outrigger control module OCM1.
   - Check for ground at P2-11. If no ground present, check continuity of wire. Replace if defective.
6. Loose or broken wire #79 from auto mode outrigger switch S24 to pin #P2-6 on outrigger control module OCM1.
   - Check continuity. Replace if defective.

Hydraulic System

4.2-1. All Controls Inoperative

1. Defective system dump valve 2H-21A.
   - Check valve. Replace if defective.

4.2-2. All Systems Sluggish

1. Systems contaminated.
   - Thoroughly flush Hydraulic System and add new hydraulic oil. (Refer to Section 5 for recommendations.)
2. System relief valve R1 setting to low or valve is defective.
   - Check serial number plate for correct pressure setting. Replace valve if defective.

4.2-3. Brake Will Not Release

1. Brake release valve 2H-30 stuck.
   - Check valve. Replace if defective
2. Quick brake valve 2H-25 stuck.
   - Check valve. Replace if defective.
3. Hand pump HP-2 bypassing oil.
   - Check seals for valve. Replace if defective.
4. Auto reset valve V6 stuck in closed position.
   - Check valve. Replace if defective

4.2-4. No Steer Left Or Right

1. Stuck or defective steer valve 4H-23 or 4H-24.
   - Check valve. Replace if defective
2. Steer cylinder C7 leaking internally.
   - Check cylinder. Replace if defective.

4.2-5. Work Platform Does Not Lift

1. Lift valve 2H-14D not shifting or contaminated.
   - Clean valve and reinstall.
2. Lowering valve 2H-13-1 stuck open.
   - Check valve. Replace if defective.
3. Manual lowering valve V1 stuck open.
   - Check valve. Replace if defective.
4. Brake release valve 2H-30 stuck or open.
   - Check valve. Replace if defective.
5. Lift gearbox valve 4H-33A not shifting.
   - Clean valve and reinstall. Replace if defective.
6. Gearbox valve 2H-44 stuck open.
   - Check valve. Replace if defective.
7. Defective large pump P1.
   - Check pump. Repair or replace if defective.

4.2-6. Work Platform Lifts Slowly

1. Contaminated system dump valve 2H-21A.
   - Clean valve and reinstall. Replace if defective.
2. Contaminated brake release valve 2H-30.
   - Clean valve and reinstall. Replace if defective.
3. Contaminated lowering valve 2H-13-1 or manual lowering valve V1.
   - Clean valve and reinstall. Replace if defective.

Hydraulic System

4. Controlled lowering valve V2 stuck.
   - Clean valve and reinstall. Replace if defective.
5. Contaminated or defective lift cylinder holding valve 2H-13-2 or 2H-13-3 **(ANSI/CSA)**, or manual override open 2H-13B-2 or 2H-13B-3 **(CE)**.
   - Depress manual override knob and rotate clockwise to close valve. Clean valve and reinstall. Replace if defective.
6. System relief valve R1 set to low.
   - Check serial number plate for correct pressure setting. Replace valve if defective.
7. Worn hydraulic pump P1.
   - Check pump performance. Repair or replace if defective.

4.2-7. Platform Drifts Down

1. Main lowering valve 2H-13-1 **(ANSI/CSA)** or 2H-13B-1 **(CE)**, and lift cylinder holding valves 2H-13-2 or 2H-13-3 **(ANSI/CSA)**, or manual override 2H-13B-2 or 2H-13B-3 **(CE)** open, contaminated or defective.
   - Depress manual override knob and rotate clockwise to close valve. Clean valve and reinstall. Replace if defective.
2. Manual lowering valve V1 and lift cylinder holding valve 2H-13-2 and 2H-13-3 **(ANSI/CSA)**, or 2H-13B-2 or 2H-13B-3 **(CE)** Stuck open, contaminated or defective.
   - Push valve plunger in. Clean valve and reinstall. Replace if defective.
3. Leaking cylinder packing.
   - Replace packing.

4.2-8. Down Circuit Inoperative

1. Lowering valve 2H-13-1 **(ANSI/CSA)** or 2H-13B-1 **(CE)** not shifting or defective.
   - Clean valve and reinstall. Replace if defective.
2. Lift cylinder holding valves 2H-13-2 or 2H-13-3 **(ANSI/CSA)**, or 2H-13B-2 or 2H-13B-3 **(CE)** not shifting.
   - Clean valves and reinstall. Replace if defective.
3. Plugged lowering orifice 02 or 03.
   - Remove contamination and reinstall.

4.2-9. Powered Extension Platform Will Not Extend Or Retract

1. Powered platform valve 4H-26 or 4H-27, or 4H-26A or 4H-27A not shifting or stuck.
   - Clean valve and reinstall. Replace if defective.
2. Platform extension cylinder C3 or C4 packing bad.
   - Replace packing.

4.2-10. Work Platform Does Not Shift Between Lift And Drive.

1. Lift gearbox valve 4H-33A, or traction gearbox valve 4H-32A not shifting or is sticking.
   - Clean valve and reinstall. Replace if defective.
2. Gearbox valve 4H-44 not shifting.
   - Check valve and reinstall. Replace if defective.
3. Gearbox relief valve R2 set to low.
   - Setting should be 500 psi.
4. Gearbox shift cylinder leaking internally.
   - Check cylinder. Repair or replace if defective.

Hydraulic System (Continued)

4.2-11. Outrigger Inoperative

1. Outrigger holding valve 2H-17A not shifting.
   - Check valve and reinstall. Replace if defective.
2. Outrigger valve 4H-71, 4H-72, 4H-73, 4H-74, 4H-75, 4H-76, 4H-77 or 4H-78 not shifting.
   - Depress manual override on each valve. If outriggers extend and retract, clean valves and reassemble. Replace if defective.
3. Outrigger check valve CV-7, CV-8, CV-9 or CV-10 not shifting.
   - Check valve and reinstall. Replace if defective.
4. Gearbox valve 2H-44 stuck open.
   - Check valve and reinstall. Replace if defective.

Section 5
PROCEDURES

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5

General

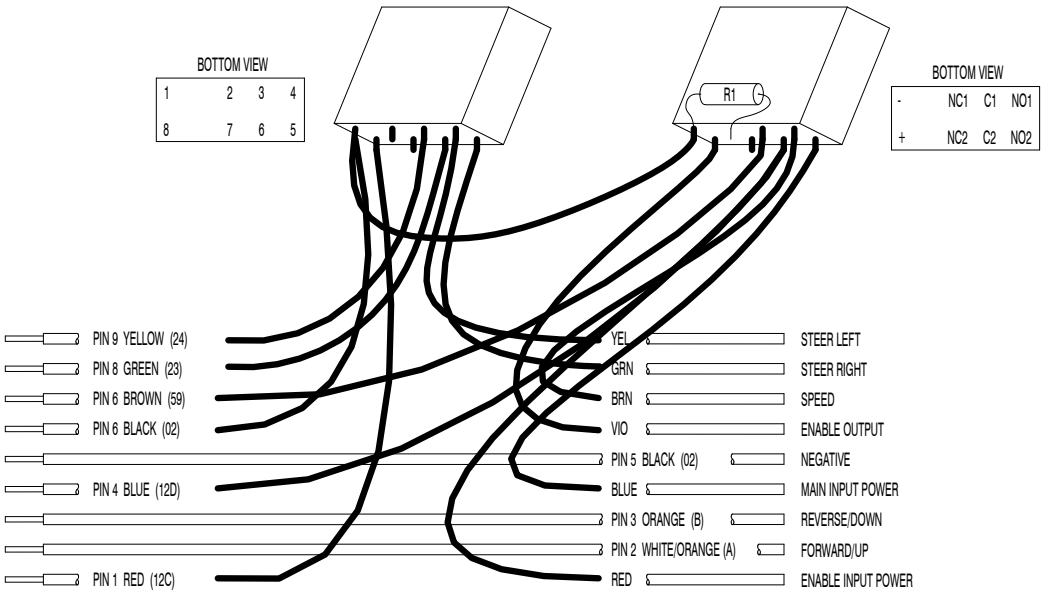
The following information is provided to assist you in the use and application of servicing and maintenance procedures contained in this chapter.

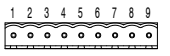
Safety and Workmanship

Your safety, and that of others, is the first consideration when engaging in the maintenance of equipment. Always be conscious of weight. Never attempt to move heavy parts without the aid of a mechanical device. Do not allow heavy objects to rest in an unstable position. When raising a portion of the equipment, ensure that adequate support is provided.

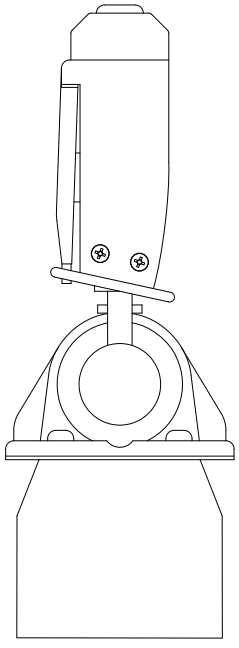
Platform

5.1-1 PQ Controller Wiring

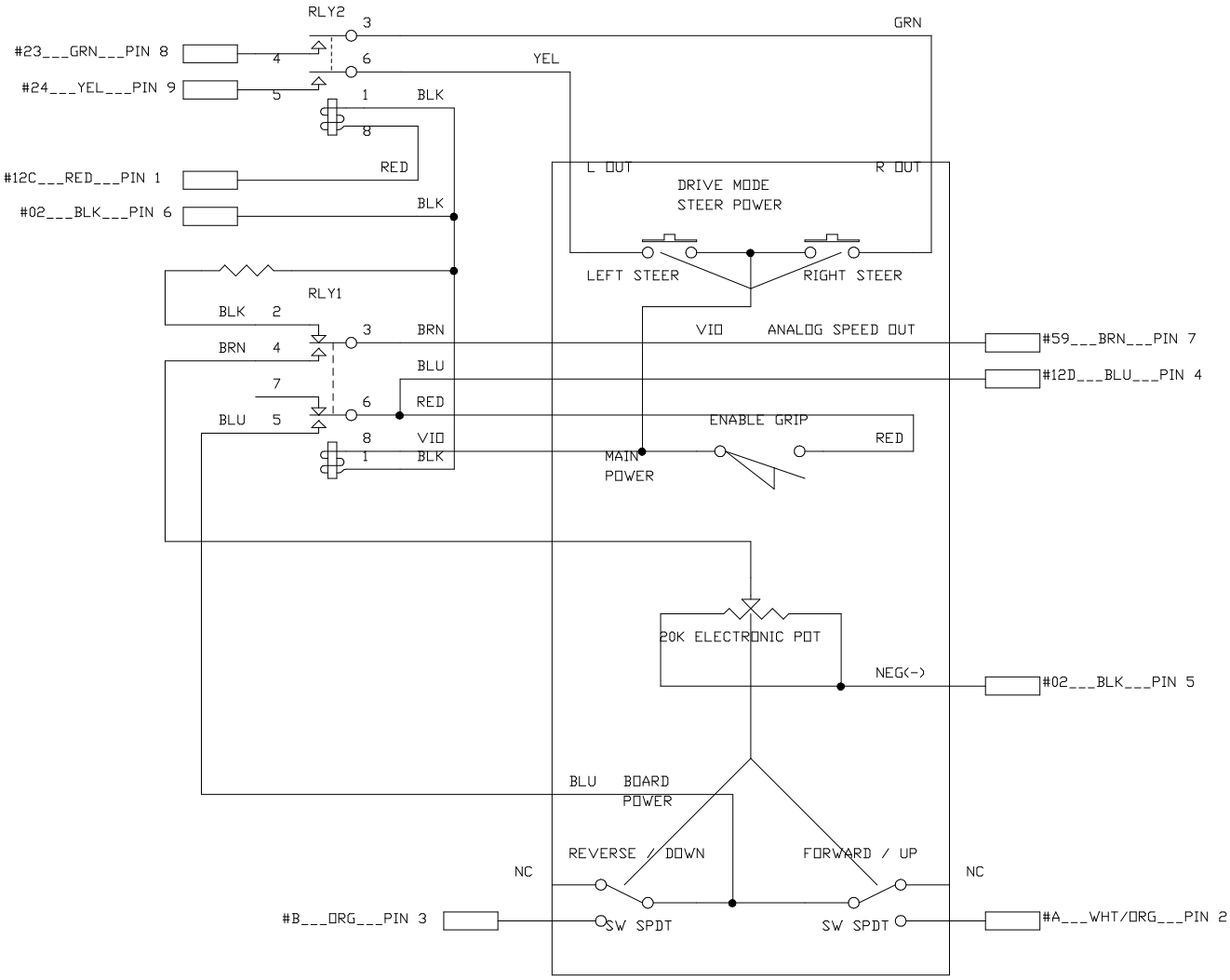




PIN 9 YELLOW (24)
PIN 8 GREEN (23)
PIN 7 BROWN (59)
PIN 6 BLACK (02)
PIN 5 BLACK (02)
PIN 4 BLUE (12D)
PIN 3 ORANGE (B)
PIN 2 WHITE/ORANGE (A)
PIN 1 RED (12C)



5.1-2 PQ Controller Wiring Diagram



Base

5.2-1 System Relief Pressure Adjustment

1. Locate the System Pressure Quick Disconnect Port on the Main Manifold. Refer to Section 3 “Hydraulic Manifold And Port Identification” for location.
2. Install a Calibrated 3000 PSI Gauge to the System Pressure Quick Disconnect Port.
3. Remove the Platform Control Box from the Guardrail and disconnect from the Main Control Cable.
4. Locate the Main Control Cable Plug in the Hydraulic/ Electric side of cabinet.
5. Disconnect the Main Cable and connect the Platform Control Box into the Plug.
6. At the Main Manifold, loosen the Locknut on the System Relief Valve R1. Refer to Section 3 “Hydraulic Manifold And Port Identification” for location.
7. Select Drive with the Lift/Off/Drive Select Switch on the Platform Control Box.
8. Engaged Steer Right and hold.
9. Observe reading on Gauge. Adjust the R1 System Relief Value listed on the Serial Number Plate. Turning the stem on the Relief Valve clockwise increases pressure. Turning the stem counterclockwise decreases pressure.
10. Release Steer Switch and tighten the Locknut.
11. Remove the gauge from the System Pressure Test Port.

5.2-2 Gearbox Relief Pressure Adjustment

1. Locate the Gearbox Quick Disconnect Port on the Main Manifold. Refer to Section 3 “Hydraulic Manifold And Port Identification” for location.
2. Install a Calibrated 1000 PSI Gauge to the Gearbox Quick Disconnect Port.
3. At the Main Manifold, loosen the Locknut on the Gearbox Relief Valve R2. Refer to Section 3 “Hydraulic Manifold And Port Identification” for location.
4. Disconnect the shift sensors plug (CN6) located near the top left corner of the main control board. Refer to Section 3.
5. Select Platform Controls. The Small Pump (P2) will start operating.
6. Observe reading on gauge. Adjust Gearbox Relief Valve (R2) to obtain 500 PSI. Turning the stem on the Relief Valve clockwise increases pressure. Turning the stem counterclockwise decreases the pressure.
7. Reconnect wiring to the Proximity Switches and tighten the Locknut on the Relief Valve.
8. Remove the gauge form the Gearbox Pressure Test Port.

5.2-3 Brake Pressure Adjustment

1. Locate Pressure Switch (PS2) on Main Manifold. Refer to Section 3 “Hydraulic Manifold And Port Identification” for location.
2. Disconnect spade connectors for pressure switch wires.
3. Turn the black knurled portion of the pressure switch body counter-clockwise until movement stops.
4. Turn the black knurled portion of the pressure switch clockwise for only four full revolutions and reconnect spade connectors.
5. Install 3000 PSI Gauge to quick coupler on main manifold. Refer to Section 3 “Hydraulic Manifold And Port Identification” for location.
6. Operate Drive slowly while observing gauge. It should read a minimum of 800 PSI.
7. If pressure needs to be increased, turn black knurled portion clockwise. If pressure need to be decreased turn counter-clockwise.
8. Once 800 PSI is obtained, brake pressure adjustment is complete.

5.2-4 Brake Adjustment

1. Place machine on level surface and block wheels to prevent rolling in either direction.
2. Unplug battery , disconnect plug.
3. Locate brake manifold in hydraulic/electric side cabinet.
4. Depress black knob.
5. Grasp the red plunger and rapidly depress until plunger can no longer be depressed and the brake is fully released.
6. Inspect caliper and brake pads for binding. Pads should move freely on the pins.
7. Remove pin from brake cylinder clevis and brake actuating lever. Rotate actuating lever counter-clockwise to the end of it's stroke.
8. Adjust brake cylinder clevis to obtain 1/2" between the center of the holes of the actuating lever and brake cylinder clevis. See Figure 5-1. Tighten jamb nut on brake cylinder rod against clevis. Note: It is important that the brake cylinder reaches it's maximum stroke before the caliper to prevent damage to the caliper.

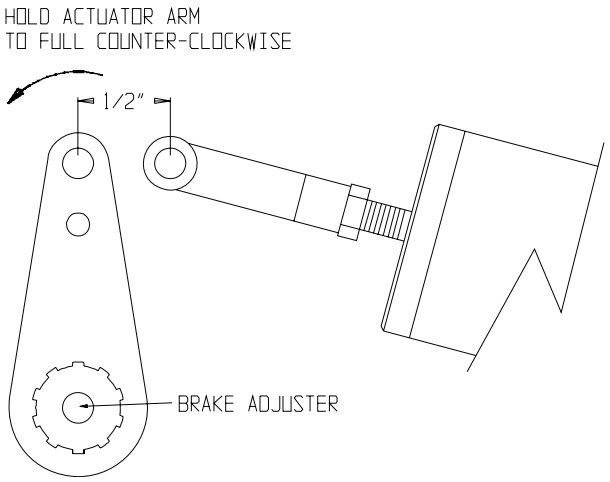


Figure 5-1. Brake Adjustment

9. Reinstall clevis pin back into the clevis actuating lever.
10. Remove plastic plug located on the end of the caliper shaft. See Figure 5-2.

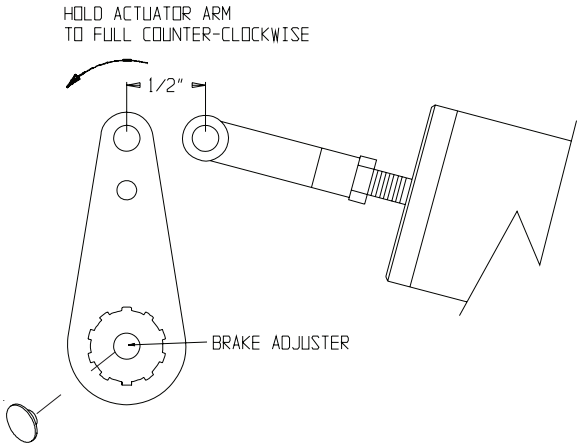


Figure 5-2. Plug Removal and Replacement

11. Using a 1/4" Allen wrench, turn brake adjuster counter-clockwise until it bottoms out. Turn Allen wrench 1/2 turn clockwise to set adjustment.
12. Replace plastic plug back into the end of the caliper shaft.
13. Pull out black knob to reset brake circuit.
14. Remove Wheel blocks. Reconnect battery, disconnect plug. Operate drive several times to seat pads to brake disc.

5.2-5 Proximity Switch Replacement and Adjustment Procedure

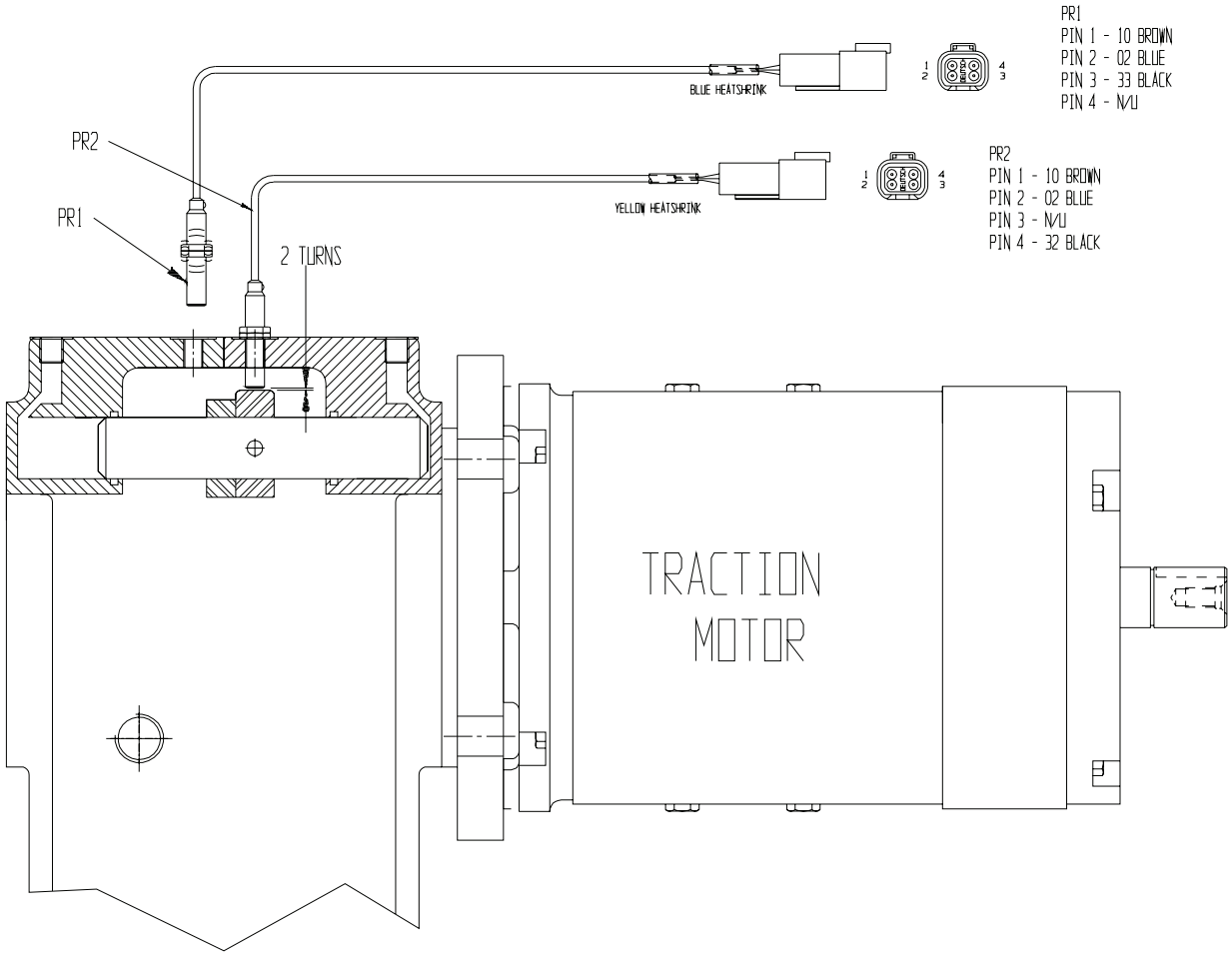


Figure 5-3. Traction Motor/Lift Pump Proximity Switch Location

1. To replace a proximity switch. First select either: lift mode to replace the PR2 proximity switch or traction mode to replace the PR1 proximity switch.
2. Disconnect the main battery disconnect plug.
3. Unplug the connector for the electrical wiring to the proximity switch you want to replace.
4. Back off the lock nut and remove the proximity switch from the gearbox.

NOTE

There should be threads of the proximity switch showing when it bottoms out. Then back off the switch two full turns. This insures the switch is set at the proper distance from it's sensing surface of 2mm.

5. To install the new proximity switch turn the switch in until it bottoms out.
6. Tighten the lock nut down while holding the proximity switch in it's adjusted position.
7. Reconnect the connector for the electrical wiring to the proximity switch.
8. Reconnect the main battery disconnect plug.

WARNING

Make sure the correct proximity switch is adjusted. If the switch you are adjusting does not match the selected mode you will damage the component.

5.2-6 Proximity Switch Test Procedure

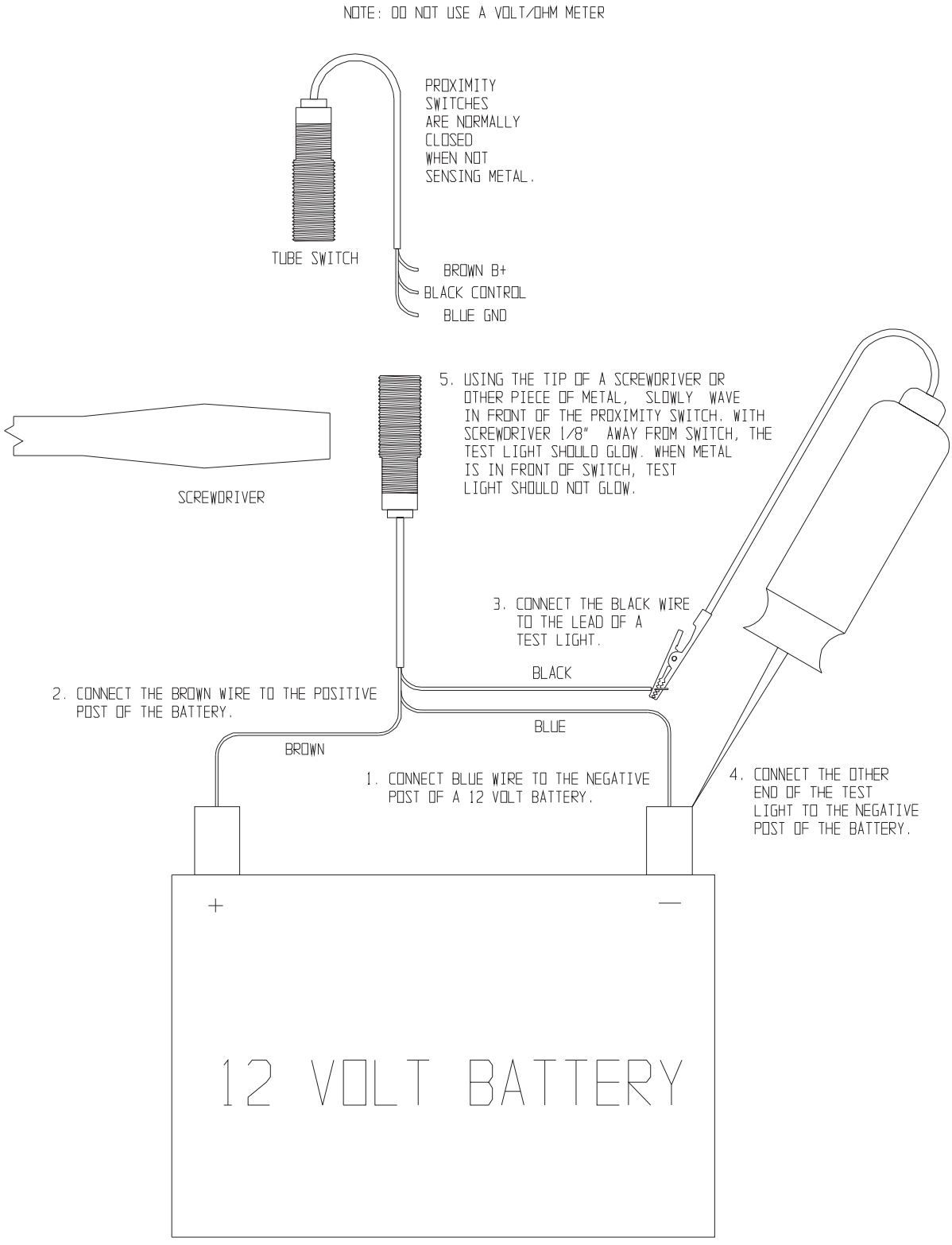

NOTE: DO NOT USE A VOLT/OHM METER
PROXIMITY SWITCHES ARE NORMALLY CLOSED WHEN NOT SENSING METAL.
TUBE SWITCH
BROWN B+
BLACK CONTROL
BLUE GND
5. USING THE TIP OF A SCREWDRIVER OR OTHER PIECE OF METAL, SLOWLY WAVE IN FRONT OF THE PROXIMITY SWITCH. WITH SCREWDRIVER 1/8" AWAY FROM SWITCH, THE TEST LIGHT SHOULD GLOW. WHEN METAL IS IN FRONT OF SWITCH, TEST LIGHT SHOULD NOT GLOW.
SCREWDRIVER
3. CONNECT THE BLACK WIRE TO THE LEAD OF A TEST LIGHT.
BLACK
2. CONNECT THE BROWN WIRE TO THE POSITIVE POST OF THE BATTERY.
BLUE
BROWN
1. CONNECT BLUE WIRE TO THE NEGATIVE POST OF A 12 VOLT BATTERY.
4. CONNECT THE OTHER END OF THE TEST LIGHT TO THE NEGATIVE POST OF THE BATTERY.
+
—
12 VOLT BATTERY

Figure 5-4. Proximity Switch

5.2-7 Wheel Bolt/Nut Inspection and Torquing Procedure

It is necessary to check the torque on all wheel nuts and wheel bolts at pre-delivery, after 8 hours of operation and at weekly intervals using the following procedure:

1. Confirm that each wheel fastener is torqued to 140 ± 5 ft-lb. All fasteners must be torqued using the tightening sequence shown below.

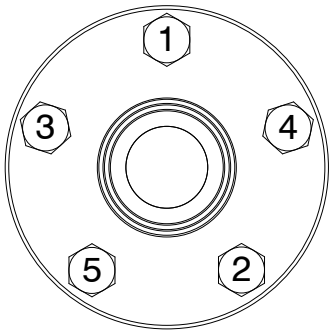


Figure 5.5 Wheel Fastener Tightening Sequence

2. Again, confirm that each wheel fastener is torqued to the specified tolerance. Re-torque as necessary until all fasteners are properly torqued.

5.2-8 Wheel Reinstallation and Torquing Procedure

When a wheel/tire assembly has been removed or replaced, it will be necessary to follow the procedure below to ensure proper installation:

1. Inspect wheel fastener threads for damage of defects. Replace if defective.
2. Clean the mounting surfaces of the hub and wheel rim of debris, rust, excess paint, etc.
3. Mount wheel on the hub, centering mounting holes on the wheel studs or bolt holes. Use appropriate lifting device as required.
4. Install wheel nuts or wheel bolts and hand tighten to center the rim.
5. Torque nuts or bolts to approximately 50 ft-lb using the tightening sequence in procedure 5.2-7.
6. Torque again to 100 ft-lb using the same sequence.
7. Torque again to 140 ft-lb using the same sequence.
8. Repeat the tightening sequence to confirm that none have changed from 140 ft-lb. If any are found below 140 ft-lb, repeat complete sequence until there is no change in torque values. If possible, drive the machine prior to checking torques.
9. Check torque values after 8 hours of operation and then at weekly intervals.

5.2-9 Front Axle Hub Procedure

For front axle hub components, refer to your aerial platform's parts manual.

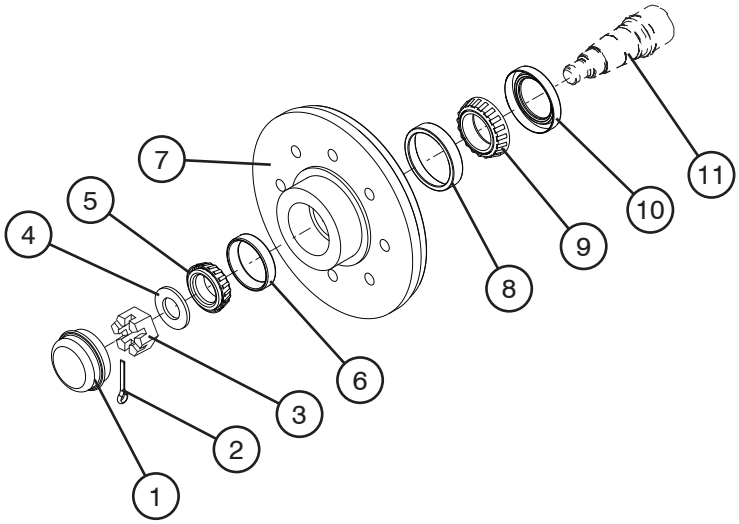


Figure 5.6 Front Axle Hub

NOTE

Keep work area clean and visibly free from contamination at all times.

1. Ensure aerial platform is parked on a firm, level surface. Chock or block the wheels to keep the aerial platform from rolling forward or backward.
2. Fully lower the platform.
3. Using a suitable lifting device or outriggers (if equipped), lift the end of the aerial platform with the steer axle.

CAUTION

Use a suitably-rated support stand to support aerial platform while performing the following operations.

4. Turn emergency main power disconnect switch to "◯" off position.
5. Remove wheel assembly.
6. Remove dust cap (item 1) to access internal components of hub assembly.
7. Pull cotter pin (item 2) out of spindle arm (item 11) and then remove castle nut (item 3), washer (item 4) and outer bearing cone (item 5). Dispose of dust cap, cotter pin, castle nut, washer, and outer bearing cone.
8. Flip hub over and then remove and discard inner bearing cone (item 8) and grease seal (item 10).
9. Remove and discard both inner and outer bearing cups (items 6 & 8) from hub.
10. Remove grease from spindle arm and hub and look for signs of visible damage. If damage is found on the hub or on the spindle arm, contact Service Department immediately using information found in page 2 for further instructions.
11. Press new bearing cups (items 6 & 8) into hub.
12. Pack replacement inner and outer bearings by either pressing wheel bearing grease into each roller by hand or using a bearing packer and grease gun. Ensure that grease is forced into all surfaces of the bearing.

NOTE

Use only recommended wheel bearing grease - NLGI (National Lubricating Grease Institute) Grade #2 or equivalent.

NOTE

The bearings must be packed before installing.

13. Install replacement inner bearing in the race and then seat the new grease seal. Flip hub over and install replacement outer bearing.
14. Install hub on the spindle.
15. Install replacement washer and replacement castle flanged nut. Hand tighten the castle flanged nut until it touches the washer. Turn hub by hand to ensure smooth running. No resistance should be felt at this time.
16. Take a torque wrench and set it at 30 ft-lb, and while continuously rotating hub, tighten castle flanged nut. While hub is being turned and nut tightened, resistance will increase.

17. Using an open-ended wrench, loosen castle flanged nut a 1/4 turn while turning the wheel hub. It should turn easily. The nut should not come completely loose.

18. Using a torque wrench set to 15 ft-lb, tighten castle flanged nut. Turn wheel hub and check for smooth turning.

19. Check for alignment of the castle flanged nut with one of the cross holes in spindle arm. If required, loosen nut to align with nearest hole. Use an open-ended wrench to be able to see the cross holes. The nut should not be turned more than 15 degrees. Secure with new cotter pin. Check again for smooth turning of wheel hub. The wheel hub should turn but with slight resistance.

20. Grab the top and bottom of the hub and check for play. There should be no evidence of play.

21. Install dust cap back on hub assembly.

22. Install wheel assembly. Torque nuts or bolts to 140 ft-lb.

23. Repeat steps 5 to 22 for the other hub assembly.

24. Lower the aerial platform.

Sevcon Calibration Tool

5.3-1 Sevcontroller Adjustment and Diagnostics

WARNING

All machine functions remain operational while calibrator is plugged in.

Adjustment Procedure

The following procedure is relevant for the drive controller, except where otherwise noted. The controller is preset to factory specifications but may be readjusted.

A hand-held calibrator (Figure 5-7, Skyjack part #701051) can be plugged into the controller adjustment socket and used to digitally view or reset the parameters. The current value of these parameters will be shown on an LCD display. Additionally, the calibrator can perform certain measurements that can be useful for diagnostic purposes.

The calibrator has a bar display, operated by the SELECT button, showing the parameters/ measurement selected and an LCD display showing values that, provided they are parameters, may be adjusted using the +/- buttons. This unit can also be used to perform certain tests on the control wiring and controller (joystick).

1. Locate Sevcon inside Electrical/Hydraulic Cabinet on the right side of the machine.
2. Locate controller adjustment socket, as shown in Figure 5-8, and connect hand-held calibrator. Power up the Platform by selecting platform controls using key switch at the Platform Control Box.

WARNING

Before making any adjustments, you must determine the revision of your calibrator. When the calibrator is plugged in, turn the power on and push and hold down the "-" button for 5 seconds.

3. No LED segments on the bar display will be lit and the minutes/seconds count is displayed. The hours count is displayed by pressing the (-) button and the 1000's of hours count is displayed by pressing the (+) button as described later in this section. Pressing the select button reverts the calibrator to its normal operation and the IMax LED will be lit.
4. When the desired parameters has been selected, on the left side of the calibrator, it may be adjusted by pressing the + or - button on the right side of the calibrator. (For calibrator Revision .07, see Table 5-1A) or (for calibrator Revision .10, see Table 5-1B).
5. When the calibrator is unplugged the Sevcontrol will 'memorize' the new parameters settings.

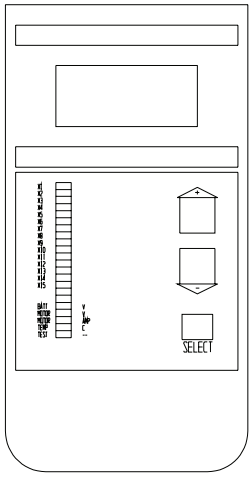


Figure 5-7. Sevcon Calibrator

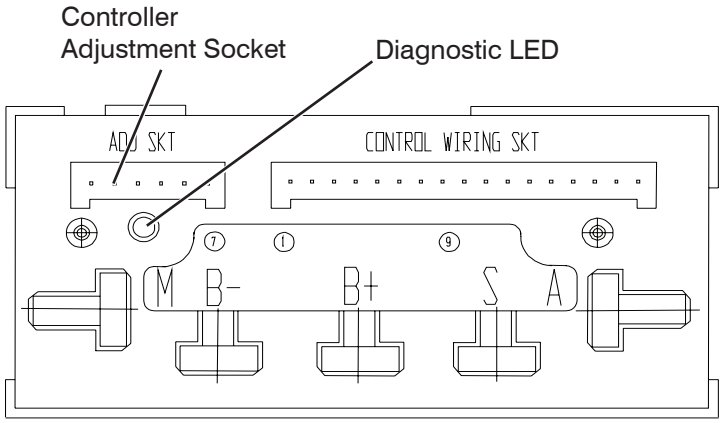


Figure 5-8. Traction Controller

Table 5-1A. Sevcontrol Adjustable Parameters (Software Revision .07)

Sequence No.	Parameter	Min.	Max.	Units	Default
1	IMAX Maximum Controller Current	50	600	Amps	400
2	ACCEL Acceleration Delay	1	3	Seconds	1
3	DECEL Deceleration Delay	0.1	3	Seconds	0.1
4	CREEP Maximum Controller Current	0	10	% of Max. Speed	2
5	MAX Maximum Allowed Speed	5	100	% of Max. Possible Speed	80
6	ELEVA Elevated Cutback Speed	5	25	% of Max. Speed	15
7	TILT Tilted Cutback Speed	5	75	% of Max. Speed	50
8	CONSTANT SPEED CONTROL Proportional Gain (Do Not Adjust)	0	150	Counts	30
9	CONSTANT SPEED CONTROL Integral Gain (Do Not Adjust)	1	100	Counts	20
10	BATTERY Low Battery Cut-out	25	40	Volts	25
11	Not Used				
12	Not Used				
13	BRAKE Brake Personality Timer	0	3	Seconds	0.5

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NOTE: Skyjack does NOT recommend exceeding the default settings.

WARNING

Before making any adjustments, you must determine the revision of your software. When the calibrator is plugged in, turn the power on and push and hold down the "-" button for 5 seconds.

Table 5-1B. Sevcontrol Adjustable Parameters (Software Revision .10)

Sequence No.	Parameter	Min.	Max.	Units	Default Settings*	8841E Modified
1	IMAX Maximum Controller Current	50	600	Amps	400	400
2	ACCEL Acceleration Delay	1	3	Seconds	1	1
3	DECEL Deceleration Delay	0.1	3	Seconds	0.1	0.1
4	CREEP Maximum Controller Current	0	10	% of Max. Speed	2	2
5	MAX Maximum Allowed Speed	5	100	% of Max. Possible Speed	80	80
6	ELEVA Elevated Cutback Speed	5	25	% of Max. Speed	15	8
7	TILT Tilted Cutback Speed	5	75	% of Max. Speed	50	50
8	CONSTANT SPEED CONTROL Proportional Gain (Do Not Adjust)	0	150	Counts	30	30
9	CONSTANT SPEED CONTROL Integral Gain (Do Not Adjust)	1	100	Counts	20	20
10	BATTERY Low Battery Cut-out	25	40	Volts	25	25
11	Not Used					
12	Not Used					
13	ELEVATED CURRENT Max. Current When Elevated	50	400	Amps	230	230
14	BRAKE Brake Personality Timer	0	3	Seconds	0.5	0.5

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* All aerial platforms will use default settings, unless specified.

NOTE: Skyjack does NOT recommend exceeding the default settings.

WARNING

Before making any adjustments, you must determine the revision of your software. When the calibrator is plugged in, turn the power on and push and hold down the "-" button for 5 seconds.

Hour Counter

The hours counter records pulsing hours, and is displayed when the calibrator is first plugged in. Once the SELECT button is pressed, the calibrator reverts to normal operation.

Initially a minute/seconds count is displayed. By pressing the (-) button, hours are displayed and by pressing the (+) button 1000's of hours are displayed.

Releasing the buttons reverts back to the minute/seconds display. The decimal point blinks every second during drive. The counter will record up to 65,500 hours before rolling back to 0.

Diagnostic Procedure

WARNING

All machine functions remain operational while calibrator is plugged in.

The last five segments on the bar display are as follows.

BATT	Displays the current battery voltage. Pressing the (+) button displays the highest voltage, for the machine, that the Sevcontrol has recorded.
MOTOR V.	Displays the motor voltage as the machine is being driven.
MOTOR AMP	Displays the motor current as the machine is being driven.
TEMP	Displays the temperature of the MOSFET heat sink in °C. Pressing the (+) button displays the highest temperature recorded and pressing the (-) button displays the lowest temperature recorded.
TEST	This invokes the diagnostic test routines to check machine switches, joystick, control wiring etc.

With the calibrator connected and the platform powered up, as described in the adjustment procedure. Use the SELECT button to select the test segment. If the SELECT button is pressed at any time during the test, the test will be terminated and the minute/seconds count will be displayed.

The first test displayed, on the drive Sevcontrol, is the joystick input. This displays the input as 0-100% as joystick is moved from min. to max.

Pressing the (+) and (-) buttons step through the tests as shown in Table 5-2. After the final test, the sequence will loop back to the joystick input test, then test 1.

Table 5-2. Sevcontrol Test Sequence

Drive Controller Test Sequence		
Sequence No.	**Test**	**Display**
-	Controller (Joystick) Input	0 to 100%
1	Forward Switch	CL/OP
2	Reverse Switch	CL/OP
3	Tachometer Input	0 to 100%
4	Elevated Position	CL=Collapsed OP=Lifted
5	Tilt Switch	CL=Level OP=Tilt
6	Pump/Traction Switch	CL=Pump Mode OP=Traction Mode
7	Actual Direction, Tachometer Output	CL= Reverse OP=Forward
8	Lift Transmission Position Sense	CL = Engaged OP = Disengaged
9	Traction Transmission Position Sense	CL = Engaged OP = Disengaged
10	First Error Latch	Value= Flash Code
NOTE: CL=Switch Closed, OP=Switch Open		

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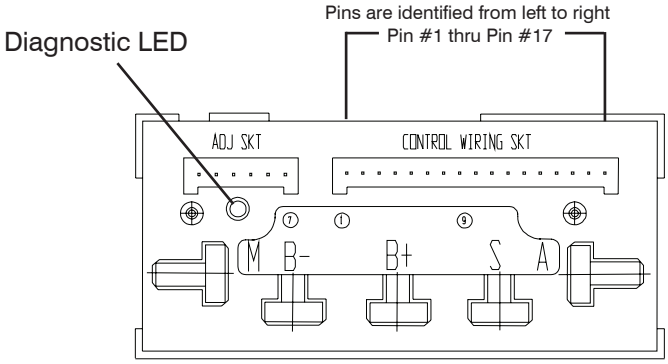
5.3-2 Traction Controller Pin Reference



Pin 1- Brake relay control.
Brings B- to brake relay (25CR).
Test between pin 1 and wire #10A.

Pin 2- Direction signal from pin 4 of tachometer card. Determines direction.
0 volts = forward.
15 volts = reverse.
Test between pin 4 and wire #02.

Pin 3- Not used.

Pin 4- High Drive Cut-out.
24 volts high drive enabled.
0 volts high drive disabled.
Test between pin 4 and wire #02 with platform fully lowered.

Pin 5- 24 volt input from line contactor.
Test between pin 6 and wire #02.

Pin 6- 48 volt input from line contactor.
Test between Pin 6 and wire #02 with Key Switch on.

Pin 7- Tilt switch input.
24 volts = full speed
0 volts = 50% full speed.
Test between pin 7 and wire #02.

Pin 8- Forward/Up input from joystick.
24 volts = drive forward or lift up selected.
Test between pin 8 and wire #02.

Pin 9- Not used
Pin 10- Not used

Pin 11- Reverse direction input from joystick
24 volts = reverse selected.
Test between pin 11 and wire #02.

Pin 12- Speed signal from pin 2 on tachometer card.
7.5 volts with joystick in neutral.
7.5 volts to 15 volts = reverse.
7.5 volts to 0 volts = forward.
Test between pin 12 and wire #02.

Pin 13- Speed sensing enable.
Determines lift or drive mode.
2 volts = drive. Speed sensing enabled.
4 volts = lift. Speed sensing disabled.
Anything above 2.52 volts = Lift
Test between pin 13 and wire #02.

Pin 14- Accelerator input.
3.8 to 4.2 volts with joystick in neutral and key switch on.
3.5 volts = slow speed.
0 volts = fast speed.
Test between pin 14 and wire #02.

Pin 15- Forward contactor output.
Brings B- to forward drive contactor.
Test between pin 15 and wire #10A.

Pin 16- Drive/Lift Select.
0 volts = drive
24 volts = lift
Test between pin 16 and wire #02.

Pin 17- Reverse contactor output.
Brings B- to reverse drive contactor.
Test between pin 17 and wire #10A.

Table 5-3. Traction Controller Flash Fault Pin References

Pin Reference Number	Number of Flashes											
	2	3	4	5	6	7	8	10	11	12	13	14
1												
2								X	X			
3												
4												
5												X
6						X						X
7										X		
8	X			X								
9												
10												
11	X			X								
12								X	X			
13											X	
14					X							
15			X	X								
16	X				X							
17			X	X								

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5.3-3 Tachometer Board Pin Reference

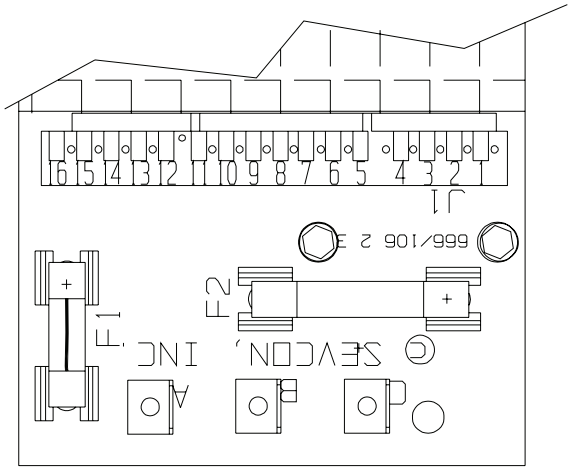


Figure 5-9. Tachometer Board

Term A- 48 volt input from relay C10D-12.

Term B- 24 volt input from wire #10B.
Test between terminal B and wire 02.

Term C- 24 volt output to drive, steer and line contactors. Fused from terminal B.
Test between terminal C and wire 02.

Pin 1- Battery negative

Pin 2- Speed signal to Pin 12 of controller.
7.5 volts with key switch on and platform selected.
7.5 volts to 15 volts = reverse
7.5 volts to 0 volts = forward
Test between pin 2 and wire #02.

Pin 3- Tachometer generator input.

Pin 4- Direction signal to Pin 2 of controller.
0 volts = forward
15 volts = reverse
Test between pin 4 and wire #02.

Pin 5- Tachometer generator input.

Pin 6- Steer enable

Pin 7- Battery Negative

Pin 8- Lift mode selected.
24 volts when lift selected.
Test between Pin 8 and wire 02.

Pin 9- Drive mode selected.
24 volts when drive selected.
Test between Pin 9 and wire 02.

Pin 10- Speed sensing enable. To Pin 13 on controller.
Drive mode = 2 volts
= speed sensing enabled.
Lift mode = 4 volts
= speed sensing disabled.
Test between pin 10 and wire #02.

Pin 11- Spike suppression for 24 volt B+.

Pin 12- Not used

Pin 13- Spike suppression B-.

Pin 14- Not used`

Pin 15- Not used

Pin 16- Not used

5.3-4 Tachometer Generator Testing Procedure

1. Locate tachometer generator on back of drive motor. Remove rubber boot from the rear of the tachometer generator.

NOTE

Wires must be reattached to the same terminals as they were removed from or the Sevcon controller will not function when reassembled.

2. Mark the location of the wires attached to the generator and remove wires.

NOTE

Do not attempt to remove the tachometer generator from mounting plate until it has been determined to be defective.

3. Remove the four 5/16-18 x 1-1/2" bolts securing the tachometer generator mounting plate to the rear of the motor.

4. Remove the coupler half from the tachometer generator and attach generator to a drill with a 1000-RPM rating.

5. Attach a voltmeter to the terminals on the rear of the tachometer generator and set the meter for D.C. voltage.

6. Energize drill and read voltage on meter. At 1000-RPM voltmeter should indicate (20.8) volts. If reading is lower the tachometer generator is defective.

7. Put the drill in reverse and energize drill, read voltage on meter. At 1000-RPM voltmeter should read (-20.8) volts. If reading is lower the tachometer generator is defective.

NOTE

Steps #6 and #7, the voltage should be a smooth incline to proper voltage. If voltage is erratic it may affect the performance of the machine.

1. GEAR BOX
2. DRIVE MOTOR
3. COUPLER HALF
4. TACHOMETER GENERATOR MOUNTING PLATE
5. COUPLER HALF
6. TACHOMETER GENERATOR

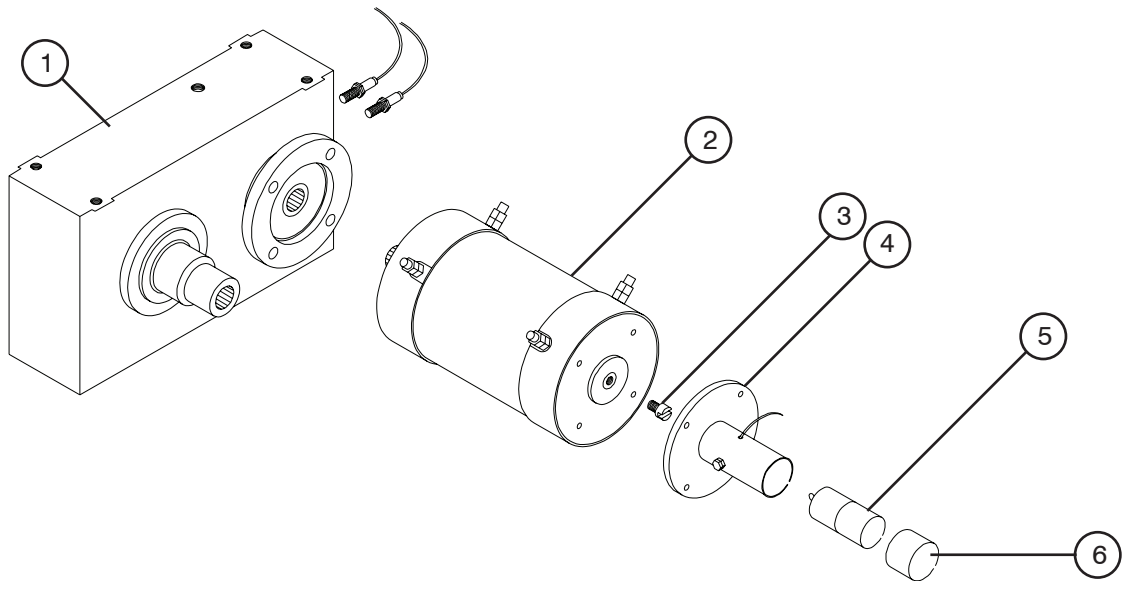
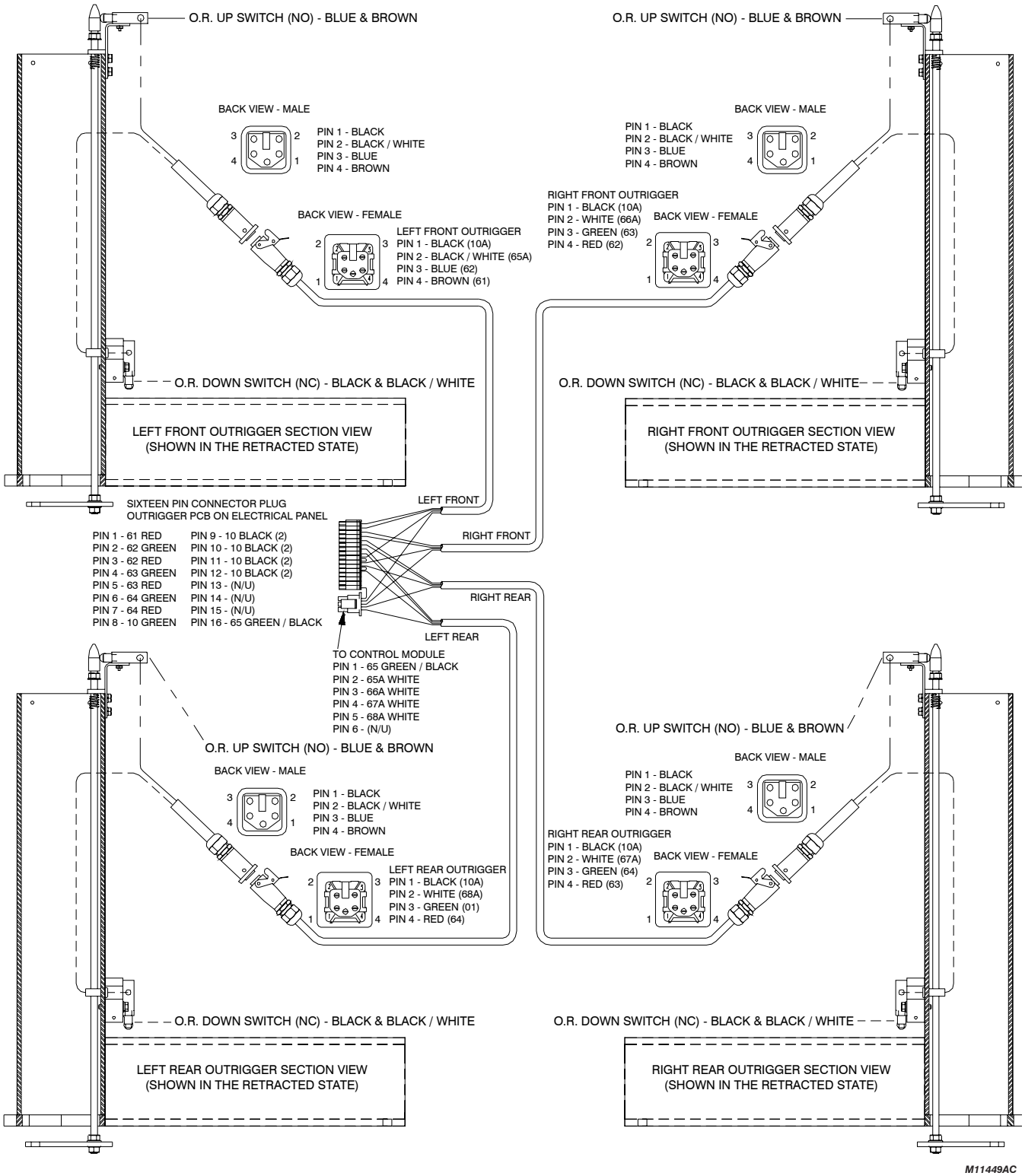


Figure 5-10. Traction Generator

Outrigger Option

5.4-1 Outrigger Mechanical Limit Switch Wiring Diagram


O.R. UP SWITCH (NO) - BLUE & BROWN
BACK VIEW - MALE
PIN 1 - BLACK
PIN 2 - BLACK / WHITE
PIN 3 - BLUE
PIN 4 - BROWN
BACK VIEW - FEMALE
LEFT FRONT OUTRIGGER
PIN 1 - BLACK (10A)
PIN 2 - BLACK / WHITE (65A)
PIN 3 - BLUE (62)
PIN 4 - BROWN (61)
O.R. DOWN SWITCH (NC) - BLACK & BLACK / WHITE
LEFT FRONT OUTRIGGER SECTION VIEW
(SHOWN IN THE RETRACTED STATE)
O.R. UP SWITCH (NO) - BLUE & BROWN
BACK VIEW - MALE
PIN 1 - BLACK
PIN 2 - BLACK / WHITE
PIN 3 - BLUE
PIN 4 - BROWN
RIGHT FRONT OUTRIGGER
PIN 1 - BLACK (10A)
PIN 2 - WHITE (66A)
PIN 3 - GREEN (63)
PIN 4 - RED (62)
BACK VIEW - FEMALE
O.R. DOWN SWITCH (NC) - BLACK & BLACK / WHITE
RIGHT FRONT OUTRIGGER SECTION VIEW
(SHOWN IN THE RETRACTED STATE)
SIXTEEN PIN CONNECTOR PLUG
OUTRIGGER PCB ON ELECTRICAL PANEL
PIN 1 - 61 RED
PIN 2 - 62 GREEN
PIN 3 - 62 RED
PIN 4 - 63 GREEN
PIN 5 - 63 RED
PIN 6 - 64 GREEN
PIN 7 - 64 RED
PIN 8 - 10 GREEN
PIN 9 - 10 BLACK (2)
PIN 10 - 10 BLACK (2)
PIN 11 - 10 BLACK (2)
PIN 12 - 10 BLACK (2)
PIN 13 - (N/U)
PIN 14 - (N/U)
PIN 15 - (N/U)
PIN 16 - 65 GREEN / BLACK
LEFT FRONT
RIGHT FRONT
RIGHT REAR
LEFT REAR
TO CONTROL MODULE
PIN 1 - 65 GREEN / BLACK
PIN 2 - 65A WHITE
PIN 3 - 66A WHITE
PIN 4 - 67A WHITE
PIN 5 - 68A WHITE
PIN 6 - (N/U)
O.R. UP SWITCH (NO) - BLUE & BROWN
BACK VIEW - MALE
PIN 1 - BLACK
PIN 2 - BLACK / WHITE
PIN 3 - BLUE
PIN 4 - BROWN
BACK VIEW - FEMALE
LEFT REAR OUTRIGGER
PIN 1 - BLACK (10A)
PIN 2 - WHITE (68A)
PIN 3 - GREEN (01)
PIN 4 - RED (64)
O.R. DOWN SWITCH (NC) - BLACK & BLACK / WHITE
LEFT REAR OUTRIGGER SECTION VIEW
(SHOWN IN THE RETRACTED STATE)
O.R. UP SWITCH (NO) - BLUE & BROWN
BACK VIEW - MALE
PIN 1 - BLACK
PIN 2 - BLACK / WHITE
PIN 3 - BLUE
PIN 4 - BROWN
RIGHT REAR OUTRIGGER
PIN 1 - BLACK (10A)
PIN 2 - WHITE (67A)
PIN 3 - GREEN (64)
PIN 4 - RED (63)
BACK VIEW - FEMALE
O.R. DOWN SWITCH (NC) - BLACK & BLACK / WHITE
RIGHT REAR OUTRIGGER SECTION VIEW
(SHOWN IN THE RETRACTED STATE)
M11449AC

5.4-2 Auto-Leveling Outrigger Setting and Error Codes

Reading the Codes:
In order to read the fault codes, a sequence of pauses and flashes can be seen on the LED mounted on the outrigger control module. The codes are continuously displayed by the LED until the fault is cleared, the outrigger control module is reset and no longer detects the fault, or idle timeout becomes active.

The sequence is as follows:
1. Half second flashes followed by half second pauses indicate the first digit.
2. A 2.5 second pause.
3. Half second flashes followed by half second pauses indicate the second digit
4. A 5 second pause.

Repeat steps 1-4

Since the outrigger control module only reports one error, only one code can be read from the LED per instance. If the error is cleared and another error is present, it will then be presented.

LED Error Codes

EVERYTHING OK	ON
VEHICLE TILTED	1/1
OUTRIGGERS CANNOT BE MOVED!	1/2
OUTRIGGERS NOT HOME	2/2
NOT FULLY LEVEL	2/1
RELEASE OUTRIGGER DEMAND!	5/5
CHECK OUTRIGGER SUPPLY (P4-9)	5/2
CANNOT LEVEL : BAD TILT SENSOR	7/1
OUTRIGGERS MANUALLY CONTROLLED!	6/6
TESTING HWFS	7/8
B+ SUPPLY TOO LOW	5/1
STARTUP!	7/7
FAULT: BAD SLAVE MICRO	7/5
FAULT: BAD TILT SENSOR	7/1
FAULT: BAD HWFS	7/2
FAULT: P2-5 FAULTY	8/1
FAULT: P2-6 FAULTY	8/2
FAULT: P2-8 STUCK ON	8/3
FAULT: P2-8 ALWAYS ON	8/4
FAULT: P2-8 ALWAYS OFF	8/5
FAULT: HWFS STALLED!	7/6

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5.4-3 Auto-Leveling Outrigger Error Code Breakdown

RELEASE OUTRIGGER DEMAND!	5/5
Check inputs on P2 pins 5 & 6 - the “auto-level” or “auto-retract” input is active at power-on or when it is not allowed to carry out the function.	

OUTRIGGERS CANNOT BE MOVED!	1/2
Check input on P2 pin 10 – “auto-level” or “auto-retract” has been requested but the platform is elevated.	

NOT FULLY LEVEL	2/1
The outrigger legs are all down (touching the ground) but the platform is not fully level.	

OUTRIGGERS NOT HOME	2/2
The outrigger legs are not all down (touching the ground) and also are not all home (fully retracted).	

B+ SUPPLY TOO LOW	5/1
CHECK OUTRIGGER SUPPLY (P4-9)	5/2
Check that the battery voltage is not too low.	

VEHICLE TILTED	1/1
These is not a true fault – move the vehicle to level ground!	

TESTING HWFS	7/8
STARTUP!	7/7
These are not true faults unless they do not clear – the start-up tests should only occur for a short time.	

OUTRIGGERS MANUALLY CONTROLLED!	6/6
This is not a true fault – the outriggers are being manually operated (one or more outrigger legs on P4 pins 1-8 is high, when the outrigger control module is not active.	

CANNOT LEVEL (BAD TILT SENSOR)	7/1
FAULT: BAD TILT SENSOR	7/1
FAULT: BAD HWFS	7/2
FAULT: BAD SLAVE MICRO	7/5
FAULT: HWFS STALLED!	7/6
FAULT: P2-5 FAULTY	8/1
FAULT: P2-6 FAULTY	8/2
FAULT: P2-8 STUCK ON	8/3
FAULT: P2-8 ALWAYS ON	8/4
FAULT: P2-8 ALWAYS OFF	8/5
These are internal faults. If the fault persists after the power has been reset, the outrigger control module may need to be replaced.	

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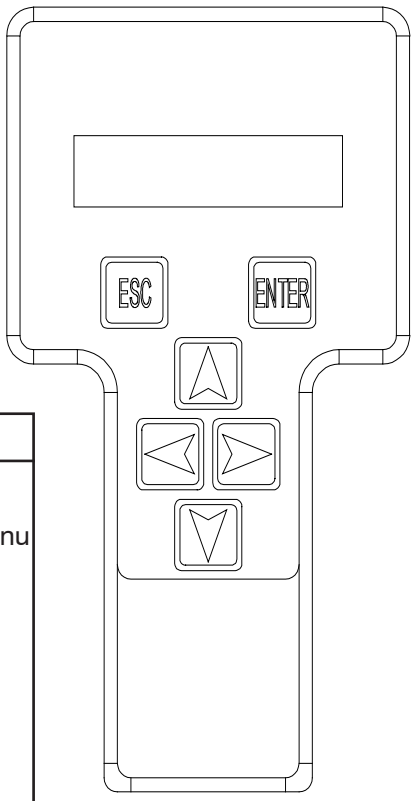
5.4-4 Hand Held Calibration/Diagnostic Tool Key Functions

WARNING

Only trained and authorized personnel shall be permitted to service an aerial platform.

WARNING

Read all instructions closely before attempting each phase of this procedure.



SYMBOL	KEY FUNCTIONS
ESC ENTER	**ESC/ENTER BUTTONS** To move back and forth between menu and sub-menu
◁ ▷	**LEFT/RIGHT BUTTONS** Select menus and setting to be adjusted
△ ▽	**UP/DOWN BUTTONS** Adjust setting values

Outrigger Settings

Models	SJIIIB 6826E	SJIIIB 6832E	7027	7127	7135	8243	8850	8831	8831E	8841	8841E	9241	9250
ANSI/CSA	4	4	5	4	4	4	4	5	5	5	5	-	5
CE	-	9	-	9	9	-	-	8	8	8	8	8	8

5.4-5 Outrigger Control Module Instructions

When EZcal hand-held device is connected to the OCM1 control module, a two line displays shows various menus and settings. At any time the top line of the display describes the currently selected menu and the bottom line shows the currently selected item in that menu.

Six buttons on **EZcal** allow easy navigation through the menus:

- ← and → change the selected item (the bottom line display)
- ENTER enters the selected new menu when available (top line display changes)
- ↑ and ↓ adjusts the selected item when available
- ESC exits the current menu back to the previous menu

TOP LEVEL MENU OPTIONS

HELP	Select this menu to see a description of current OCM1 status
DIAGNOSTICS	Select this menu to see switch input status & logged data
ACCESS LEVEL	Select this menu & enter correct code to enable adjustments and calibrations
ADJUSTMENTS	Select this menu to see and adjust OCM1 settings NOTE: this menu provides for adjustments which might be needed for different work activities
SETUPS	Select this menu to carry out initial set-up of the OCM1 NOTE: this menu provides for set-ups which are needed to configure the OCM1 for a particular vehicle

HELP MENU OPTIONS

(help message)	A message displays current OCM1 status, indicating if everything is OK or if there is an error code (see LED Error Codes - Table 5.3)

DIAGNOSTIC MENU OPTIONS

SYSTEM	Select this menu to see general OCM1 system information
SWITCHES	Select this menu to see switch input status
OUTPUTS	Select this menu to see OCM1 output status
LOG	Select this menu to see logged information

DIAGNOSTIC / SYSTEM MENU OPTIONS

OUTRIGGERS	Displays various status during the auto-level function
TILT	Displays vehicle tilt in “X” and “Y” orientations measured by integral sensor
TILTED	Displays whether vehicle is tilted (YES or NO)
BATTERY	Displays battery supply voltage (on P2-12)

DIAGNOSTIC / SWITCHES MENU OPTIONS

LR/P2-1	High when the left rear outrigger is in contact with the ground
RR/P2-2	High when the right rear outrigger is in contact with the ground
RF/P2-3	High when the right front outrigger is in contact with the ground
LF/P2-4	High when the left front outrigger is in contact with the ground
EXTEND/P2-5	High to activate the auto-level function
RETRACT/P2-6	High to activate the auto-retract function
ELEV/P2-10	High when the scissor stack is stowed (“elevated” input indicates that the vehicle is stowed).

DIAGNOSTIC / OUTPUTS MENU OPTIONS

LAMP/P2-7	Displays state of outrigger control box light
STABLE/P2-8	Displays state of stable (all legs touching the ground) output
TILT/P2-9	Displays state of tilt
LRe/P4-1	Displays state of left rear outrigger extend valve
RRe/P4-2	Displays state of right rear outrigger extend valve
RFe/P4-3	Displays state of right front outrigger extend valve
LFe/P4-4	Displays state of left front outrigger extend valve
LRr/P4-5	Displays state of left rear outrigger retract valve
RRr/P4-6	Displays state of right rear outrigger retract valve
RFr/P4-7	Displays state of right front outrigger retract valve
LFr/P4-8	Displays state of left front outrigger retract valve
P4-9 MON	Displays the voltage to the outrigger valve (can only be seen when operating in auto-level or retract)

DIAGNOSTIC / LOG MENU OPTIONS

MAX.BATTERY	Displays maximum recorded battery supply voltage
OCM1 version	Displays part number and software version of GP106
EZcal version	Displays software version of EZcal

ACCESS LEVEL MENU OPTIONS

CODE xxxx	“ACCESS LEVEL” 3 (allows viewing only) “ACCESS LEVEL” 2 (allows setup on OCM1)

ADJUSTMENTS MENU OPTIONS (factory set - not adjustable)

Xtilt TRIP	Displays the tilt trip point in the “X” orientation
Ytilt TRIP	Displays the tilt trip point in the “Y” orientation
TILT ENTRY	Displays the tilt delay time
TILT EXIT	Displays the tilt delay time
Xlevel TRIP	Displays the tilt trip point in the “X” orientation during the auto-level function
Ylevel TRIP	Displays the tilt trip point in the “Y” orientation which applies during the auto-level function

MACHINE SETUP MENU OPTIONS (factory set - not adjustable)

DEFAULTS	Allows all adjustments & machine settings to be set to defaults WARNING: all GP106 settings will be changed; use with caution!
CALIBRATE LEVEL	Allows levelling of the integral tilt sensor of the GP106, when the vehicle is positioned on level ground (see Appendix Four)
TILT MODE	Allows configuration of the GP106 tilt output (P2-9): 1 – output turns on to light lamp when tilted 2 – output turns off to cutout functions when tilted 3 – output turns off to cutout functions when tilted AND elevated
TILT FILTER	Displays the filter applied to the tilt measurements during the auto-level function (used to minimize the effect of vehicle vibrations on the tilt measurement)
Xlevel TARGET	Displays the tilt in the “X” orientation at which the auto-level function will complete.
Ylevel TARGET	Displays the tilt in the “Y” orientation at which the auto-level function will complete.
tilt SLACK	Displays the amount of vehicle tilt exceeding the Xtilt TARGET and/or Ytilt TARGET in which the auto-level function will not attempt to level EXAMPLE: Xtilt TARGET=0.3°, Ytilt TARGET=0.7°, tilt SLACK=0.5° If machine is tilted to 1.0° in the X and Y orientations, the auto-level function will attempt to level the X orientation (0.3+0.5<1.0) but will not attempt to level the Y orientation (0.7+0.5>1.0) RANGE: 0.0° to 1.0°, default 0.3°

IMPORTANT

Each phase must be completed before the next phase can be carried out.
All phases must be completed before the aerial platform can be operated.
Always follow the instructions of the Calibration instrument.

1. Ensure aerial platform is parked on a firm and level surface.

2. Elevate the scissors high enough to lay a level accross the base tubes. Ensure there is no debris on the base and the level sits flat. Do not elevate aerial platform higher than the high speed/tilt override limit switch.

3. Manually operate the outriggers and level the machine in 4 places: left side, right side, front and rear. All 4 outriggers must be firmly placed and all 4 tires are off the ground.

4. Double check that the aerial platform is level at all 4 points.

5. Connect the EZcal tool to the P1 connector on the **CONTROL MODULE**.

6. The display will show "**Help: Press Enter**".
   By using Left/Right buttons, select the "**Access Level (3)**" from the menu and press the **ENTER** button.

7. The display will show "**Access Level: Code (0000)**".
   By using the Up/Down buttons, enter the Access Level Code (1 ➔1 ➔ 2 ➔ 2) followed by pressing the **ENTER** button.

8. The display will show "**Access Level 2**".
   By using Left/Right buttons, select the "**Setups**" from the menu and press the **ENTER** button.

9. The display will show "**Setups: Change Defaults**".
   Select the "**Change Defaults**" from the menu and press the **ENTER** button.

10. The display will show "**Defaults, 0 = Custom**".
    By using Up/Down buttons, select the "Defaults: Code Setting for your Model (For Default Code Refer to Table 5-3)" from the menu and press the **ENTER** button and followed by **ESCAPE** button.

11. The display will show "**Setups Change Defaults**".
    By using Left/Right buttons, select the "**Calibrate Level**" from the menu and press the **ENTER**.

12. The display will show "**Calibrate Level: Yes: Enter, No: ESC**".
    Select the "**Yes**" from the menu by press the **ENTER** button.

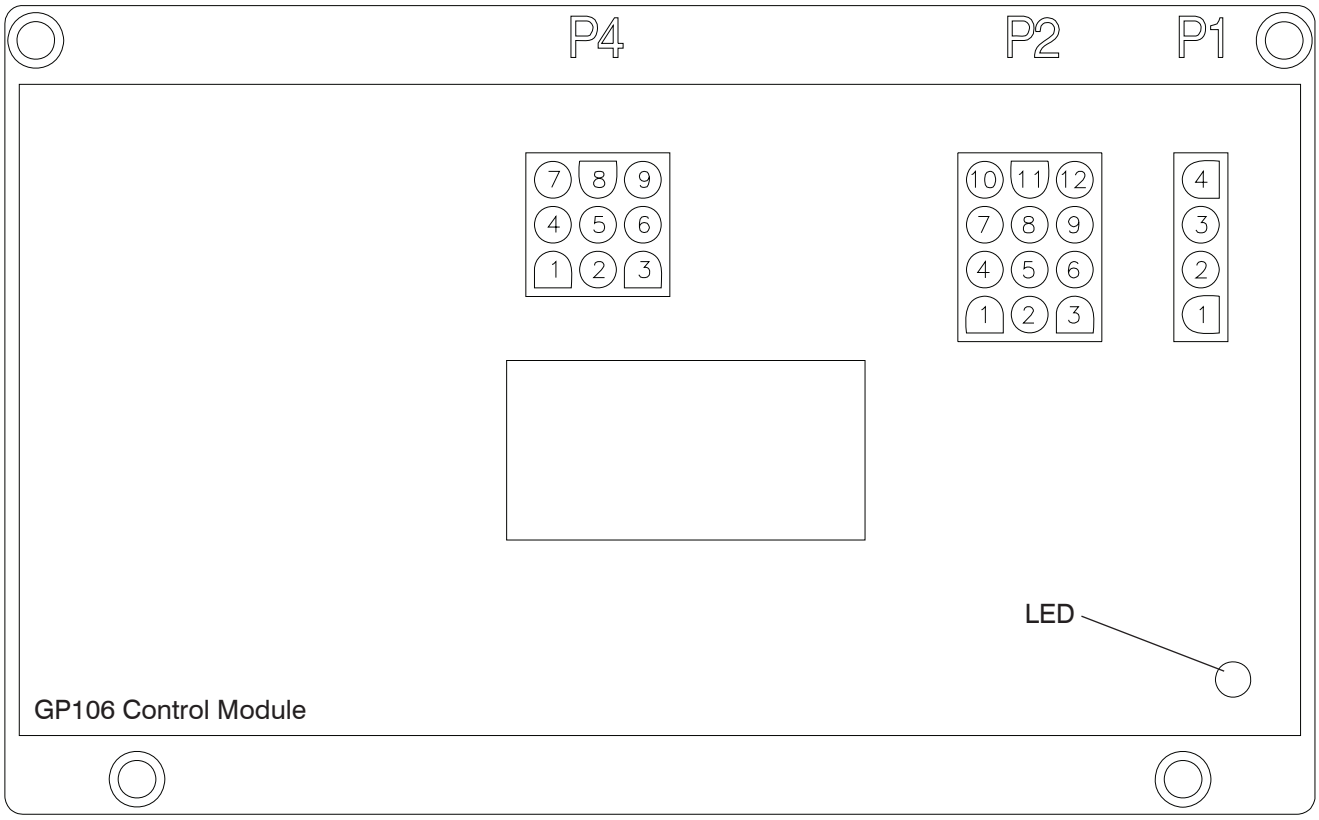
13. The display will show "**Calibrate Level: Tilt 0.0' , 0.0'**".
    Select the "**ESCAPE**" from the menu once.

14. The display will show "**Setups Calibrate Level**".
    Select the "**ESCAPE**" from the menu once again.

15. The Calibration procedure is complete, unplug and remove the EZ-Cal.

16. Close the hydraulic/electric cabinet.

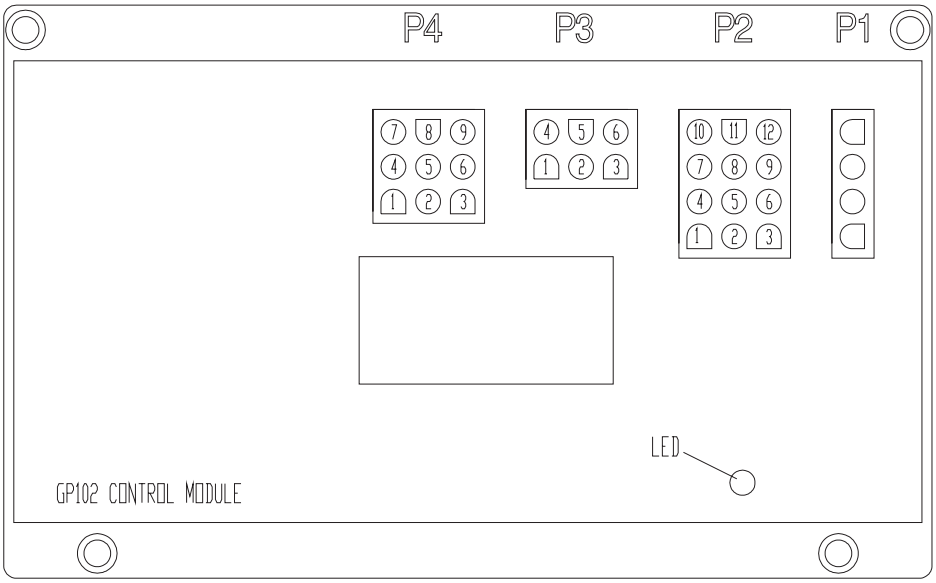
5.4-6 Auto-Leveling Outrigger Control Module Pin Reference Chart



PLUG	PIN #	WIRE # AND COLOUR	WIRE FUNCTION
P1	The Calibration Connection		
P2	1	68A White	Input indicating that the LEFT REAR outrigger is in contact with the ground
P2	2	67A Red/White	Input indicating that the RIGHT REAR outrigger is in contact with the ground
P2	3	66A Blue/White	Input indicating that the RIGHT FRONT outrigger is in contact with the ground
P2	4	65A Green/White	Input indicating that the LEFT FRONT outrigger is in contact with the ground
P2	5	70 Green/Black	Input for AUTO-LEVEL function to extend the outriggers to level the machine
P2	6	79 Green	Input for AUTO-RETRACT function to retract the outriggers until the switch is released
P2	7	70B Red/White	Outrigger Light on Outrigger Control Box
P2	8	65 Green/Black	STABLE output to indicate that all outriggers are in contact with the ground
P2	9	28E Green	TILT output to indicate that the machine is level (ANSI/CSA only)
P2	10	10A Green	Tilt override / High Drive Cutout
P2	11	02 White	Negative Input
P2	12	10 Black	Main Power Input
P4	1	78 Black/White	Output used to extend the LEFT REAR outrigger
P4	2	77 Blue/Black	Output used to extend the RIGHT REAR outrigger
P4	3	76 Red/Black	Output used to extend the RIGHT FRONT outrigger
P4	4	75 Orange/Black	Output used to extend the LEFT FRONT outrigger
P4	5	74 Black	Output used to retract the LEFT REAR outrigger
P4	6	73 Blue	Output used to retract the RIGHT REAR outrigger
P4	7	72 Red	Output used to retract the RIGHT FRONT outrigger
P4	8	71 Orange	Output used to retract the LEFT FRONT outrigger
P4	9	35C White/Black	Power input for outriggers

Load Sensing System - CE

5.5-1 Control Module Pin Reference Chart



PLUG	PIN #	WIRE # AND COLOUR	WIRE FUNCTION
P1	Calibration Connection		
P2	1	Not used	
P2	2	10E Black/White	Input from base controls
P2	3	14C Black	Platform Raise Input
P2	4	13 Orange	Platform Lower Input
P2	5	Not used	
P2	6	Not used	
P2	7	16 White/Black	Forward Direction Input
P2	8	15 Blue	Reverse Direction Input
P2	9	Not used	
P2	10	18B Red/Black	Elevated Platform Input from LS5 Limit Switch
P2	11	02 White	Negative Input
P2	12	10 Red	Main Power Input
P3	1	28E Red	Machine Level Output to pin #7 at the Sevcon- Tilt Switch Output
P3	2	29C Black	Output to Beeper BP29C
P3	3	60C Black/White	Output to Overload Warning Light on Control Box
P3	4	60 Green/Black	Output to Aux. Relays 60CR1, 60CR2, 60CR3
P3	5	02 White	Negative for Flashing Light, Beeper and Horn
P3	6	60E Green/White	Output to Relays 60ECR1, 60ECR2, 60ECR3
P4	1	Not used	
P4	2	60A Green	Varied Input from Pressure Transducer
P4	3	60B Green	Varied Input from Angle Transducer
P4	4	Not used	
P4	5	Not used	
P4	6	910 Black	Positive Signal to Angle Transducer
P4	7	900 White	Negative Signal to Pressure Transducer
P4	8	902 White	Negative Signal to Angle Transducer
P4	9	910A Black	Positive Signal to Pressure Transducer

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5.5-2 LED Error Codes - Quick Reference Chart

HELP Message	LED indication
EVERYTHING OK	Steady on
IN GROUND MODE!	Steady on
OVERLOAD FUNCTIONS DISABLED!	6/6
VEHICLE TILTED	1/1
VEHICLE OVERLOADED	1/2
WAITING FOR B+ ON P2-12	5/2
ARMGUARD ACTIVE!	1/3
TOO HIGH - DRIVE PREVENTED	1/4
TOO HIGH - LIFT UP PREVENTED	1/5
TESTING HWFS	7/8
IDLE TIMEOUT ACTIVE!	Always off
WAITING FOR NEUTRAL	5/5
ELEVATION SWITCH SHIFTED?	2/1
ELEVATION SWITCH STUCK?	2/2
NO LAST CALDATE!	6/3
LOAD NOT CALIBRATED	6/2
DRIVE/LIFT INPUTS FAULTY!	5/6
UP/DOWN SELECT INPUTS ACTIVE TOGETHER	5/4
INVALID LOAD - CHECK SENSORS	6/4
HEIGHT NOT CALIBRATED	6/1
INVALID HEIGHT - CHECK SENSOR	6/5
EMS INPUTS FAULTY!	5/2
B+ SUPPLY TOO LOW	5/1
P4-1 OR P5-1 SHORT TO 0V?	4/1
P3-4 SHORT TO SUPPLY!	4/2
P3-4 SHORT TO 0V?	4/3
P3-4 SHORT TO SUPPLY?	4/4
P3-6 SHORT TO 0V?	4/5
P3-6 SHORT TO SUPPLY?	4/6
FAULT: BAD TILT SENSOR	7/1
FAULT: BAD HWFS	7/2
FAULT: BAD SLAVE ANALOGS	7/3
FAULT: BAD STRAIN MONITORS	7/4
FAULT: BAD SLAVE MICRO	7/5
FAULT: HWFS STALLED!	7/6
STARTUP!	7/7
FACTORY OVERRIDE	6/7

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Reading the Codes:
In order to read the fault codes, a sequence of pauses and flashes can be seen on the LED mounted on the GP102 module. The codes are continuously displayed by the LED until the fault is cleared, the GP102 reset and no longer detects the fault, or idle timeout becomes active.

The sequence is as follows:
1. Quarter second flashes followed by quarter second pauses indicate the first digit.

2. A 1.5 second pause.

3. Quarter second flashes followed by quarter second pauses indicate the second digit

4. A 4 second pause. Repeat steps 1-4

Since the GP102 only reports one error, only one code can be read from the LED per instance. If the error is cleared and another error is present, it will then be presented.

5.5-3 LED Error Codes - Code Breakdown Chart

Diagnostic sequence dependant on LED flash code:

No Last Caldate	63
Load Not Calibrated	62
Height Not Calibration	61

An EZcal is required!

Waiting For Neutral	55
Drive/Lift Inputs Faulty!	56
Up/Down Select Inputs Active Together	54
EMS Inputs Faulty!	52

Check inputs on P2 pins 1,2,3,4,5,6,7,8.

P3-4 Short To Supply!	42
P3-4 Short To Supply?	44
P3-6 Short To Supply?	46

Disconnect plug P3. If fault clears there is a problem with the wiring from P3-4 or P3-6 to the rest of the vehicle.

Armguard Active!	23
Elevation Switch Shifted?	21
Elevation Switch Stuck?	22

If the 23 flash code is triggered by armguard, it will occur once then clean. This is not a true fault but just an indication of the reason for the vehicle stop. If the 21 or 22 flash code is triggered by a fault with the elevation switch, it will not clear. Check that the elevation switch correctly opens/closes when the platform is raised/lowered.

P3-4 Short To 0V?	43
P3-6 Short To 0V?	45

Disconnect plug P3. If fault clears there is a wiring fault from P3-4 or P3-6 to the rest of the vehicle.

Invalid Load - Check Sensors	45

Check the voltage out of the pressure transducer, into P4-2. It should be between 0.5V (zero pressure) and 4.5V (maximum pressure) and should vary as the platform load & position varies.

Waiting For B+ on P2-12	52
B+ Supply Too Low	51
P4-1 Or P5-1 Short To 0V?	41

Check that the battery voltage is not too low.
Verify battery voltage on P2-12.
Disconnect plug P4 – if the fault clears there is a wiring fault from P4-1 to the rest of the vehicle.

5.5-3 LED Error Codes - Code Breakdown Chart (Continued)

Vehicle Tilted	11
Vehicle Overloaded	12
Too High - Drive Prevented	14
Too High - Lift Up Prevented	15

These are not true faults but an indication that vehicle movement is prevented. Remove excessive load from the platform. Lower the platform if close to maximum height. Move the vehicle to level ground.

Invalid Height - Check Sensor	65

Check the voltage out of the height transducer, into P4-3. It should be between .4V and 4.6V and should vary as the platform position varies.

Testing HWFS	78
Start Up!	77

These are not true faults unless they do not clear – the start-up tests should only occur for a short time.

Overload Functions Disabled!	66
Factory Override	67

These are not true faults – the GP102 has been configured to suppress overload functionality.

Idle Timeout Active!	Always Off
Fault: Bad Tilt Sensor	71
Fault: Bad HWFS	72
Fault: Bad Slave Analogs	73
Fault: Bad Strain Monitors	74
Fault: Bad Slave Micro	75
Fault HWFS Stalled!	76

Action a function to clear the idle timeout if it occurred. Ensure the GP102 is correctly mounted – incorrect mounting can cause the “bad tilt sensor” diagnostic to occur. Otherwise there may be an internal problem with the GP102.

5.5-4 Control Module Load Calibration - Code Messages & Definitions

During calibration the following failure message may appear:

(Refer to 5.5-5 for hand held calibration/diagnostic tool key functions)

Code F01: Check HWFS

This message is given if the GP102 startup tests have not completed.

- Check HELP message for more information.

Code F02: Not Ground Mode

This message is given if the machine is not in ground mode (P2-2 must be high).

- Calibration can only be carried out in ground mode.

Code F03: Not Stopped

This message is given if any function switch is closed.

- Check DIAGNOSTICS / SWITCHES to see which function switch is closed.

Code F04: Tilted

This message is given if the machine is tilted.

- Calibration must be carried out with the machine level. If the machine is level, use the SETUPS / TILT SETUPS to set the GP102 level.

Code F05: Bad Height

This message is given if the height sensor output (P4-3) is out of range at the start of calibration.

- The height sensor output must be 3.7V. Check DIAGNOSTICS / SENSORS to see the output. A reading of 0V or 5V is probably due to a wiring problem.

Code F06: Check Elev

This message is given if the elevation switch (P2-10) is closed at the start of calibration, when the operator has confirmed the “PLATFORM DOWN?” question.

- If the platform is down, check the elevation switch wiring.

Code F08: Check Elev

This message is given if the elevation switch (P2-10) is closed at the end of calibration, when the platform should be fully raised.

- This message would occur if the UP switch was accidentally opened near the start of the lift. If the platform is fully raised, check the elevation switch wiring.

Code F09: Bad Height

This message is given if the height sensor output (P4-3) is out of range at the start of calibration.

- The height sensor output must be 3.7V. Check DIAGNOSTICS / SENSORS to see the output.

Code F10: Bad Height

This message is given if the height sensor output (P4-3) is out of range at the end of calibration.

- The height sensor output must be between 0.9V and 4.1V. Check DIAGNOSTICS / SENSORS to see the output. A reading of 0V or 5V is probably due to a wiring problem.

Code F11: Not Up

This message occurs at the start of calibration if the operator selects a function other than UP.

- Select the UP function only.

Code F13: Low Height Range

This message occurs at the end of calibration if the height sensor output did not change sufficiently to give a reasonably accurate platform height estimate.

This message could occur if the UP switch was accidentally opened too early (when the platform is not fully raised). DIAGNOSTICS / SENSORS can be used to check the height sensor output (P4-3). A difference of at least 1V is to be expected.

Code F15: Check Elev

This message is given if the elevation switch (P2-10) is closed when the platform has been fully lowered at the end of calibration.

This message would occur if the DOWN switch was accidentally opened before the platform was fully lowered. If the platform is fully lowered, check the elevation switch.

Code F16: Low Elev.open

This message is given if the elevation switch (P2-10) opened during lift at a too low height (below 5%).

- Check CALIBRATIONS / HEIGHT CALS; the “ElevUp” value shows the recorded height where the switch opened. Set up elevation switch to manufacturers’ specifications and calibrate load.

Code F17: High Elev.open

This message is given if the elevation switch (P2-10) opened during lift at a too high height (above 25%).

- Check CALIBRATIONS / HEIGHT CALS; the “ElevUp” value shows the recorded height where the switch opened. Set up elevation switch to manufacturers’ specifications and calibrate load.

Code F18: Low Elev.close

This message is given if the elevation switch (P2-10) closed during lower at a too low height (below 5%).

- Check CALIBRATIONS / HEIGHT CALS; the “ElevDown” value shows the recorded height where the switch opened. Set up elevation switch to manufacturers’ specifications and calibrate load.

Code F19: High Elev.close

This message is given if the elevation switch (P2-10) closed during lower at a too high height (above 25%).

- Check CALIBRATIONS / HEIGHT CALS; the “ElevUp” value shows the recorded height where the switch opened. Set up elevation switch to manufacturers’ specifications and calibrate load.

Code F20: Height<>0%

This message occurs if the platform height is not 0% after the platform has been fully lowered during either STATIC lift.

The platform must return to the same height each time it is fully lowered.

- Check DIAGNOSTICS / SYSTEM to check the height.

Code F28: Bad Height

This message indicates a problem with the height sensor output (P4-3) during calibration.

The height sensor output must be between 1.0V and 4.0V at all times.

- Check DIAGNOSTICS / SENSORS to see the output. A reading of 0V or 5V is probably due to a wiring problem.

Code F42: Low Pressure

This message indicates that the pressure transducer output (P4-2) is too low (0.5V or less) at the beginning of calibration.

- Check DIAGNOSTICS / SENSORS to read output.

Code F43: High Pressure

This message indicates that the pressure transducer output (P4-2) is too high (4.5V or more) at the beginning of calibration.

- Check DIAGNOSTICS / SENSORS to read output.

Code F44: Low Pressure

This message indicates that the pressure transducer output (P4-2) is too low (0.5V or less) at a measurement point.

- Check DIAGNOSTICS / SENSORS to read output.

Code F45: High Pressure

This message indicates that the pressure transducer output (P4-2) is too high (4.5V or more) at a measurement point.

- Check DIAGNOSTICS / SENSORS to read output.

Code F46: Check Elev

This message indicates that the elevation switch opened more than once during calibration lifting.

Code F47: Check Elev

This message indicates that the elevation switch closed more than once during calibration lower.

Code F48: Bad Pressure

This message indicates that the pressure transducer output (P4-2) is out of range at the beginning of calibration.

- Check DIAGNOSTICS / SENSORS to read output.

Code F52: Too Few

This message indicates that not enough measurements were recorded during calibration lifting or lowering.

Code F98: Out of Range

This message indicates that the “fine tune” calibration is unacceptable.

This is probably due to a faulty transducer or faulty/open holding valve(s)/ emergency lowering valve.

During calibration the following information messages may appear:

Platform Down?

This message is prompting for confirmation that the platform is fully lowered. If necessary the DOWN switch can be activated to lower the platform. Press ENTER to confirm when the platform is fully lowered.

Platform Empty?

This message is prompting for confirmation that the platform is completely empty. Press ENTER to confirm if the platform is empty.

Platform Loaded?

This message is prompting for confirmation that the platform is loaded to rated load Press ENTER to confirm if the platform is loaded.

Please Lift

This message is prompting for the platform to be raised. The UP switch should be closed.

Please Lower

This message is prompting for the platform to be lowered. The DOWN switch should be closed.

Lift Empty
This message is displayed while the platform is being raised to the next measurement height, when an EMPTY platform is being calibrated.

Lift Loaded
This message is displayed while the platform is being raised to the next measurement height, when a LOADED platform is being calibrated.

Lifting
This message is displayed while the platform is being raised, during HEIGHT-only calibration.

Measuring #
This message is displayed when the platform is stopped during calibration, when the GP102 takes a measurement. There will be a short delay while the machine is allowed to stabilize after movement is stopped.

Must Go Down!
This message occurs if the wrong switch is closed when the GP102 is waiting for the platform to be lowered.

Must Go Up!
This message occurs if the wrong switch is closed when the GP102 is waiting for the platform to be raised.

Please Wait
This message indicates that the GP102 is busy; the delay will be short (no more than 5 s).

Lower Empty
This message is displayed while the platform is being lowered to the next measurement height, when an EMPTY platform is being calibrated.

Lower Loaded
This message is displayed while the platform is being lowered to the next measurement height, when an EMPTY platform is being calibrated.

Lowering
This message is displayed while the platform is being lowered, during HEIGHT-only calibration.

Total Data:
This message is displayed at the end of each phase, to confirm the number of measurements recorded by the GP102.

Caldate
This message is prompting for the date to be entered; it is stored to identify when the machine was calibrated.

The last calibrate date can be viewed in DIAGNOSTICS / LOG. Press LEFT & RIGHT to select the flashing digits. Press UP & DOWN to change the flashing digits. Press ENTER when the entry is complete. IMPORTANT: The date 00/00/00 is not allowed!

Finished
This message confirms that calibration is complete and successful.

5.5-5 Control Module Load Calibration Procedure

1. Move the aerial platform to a test area where the platform can be elevated to its maximum working height and reach.

2. Ensure the aerial platform is parked on a firm, level surface.

IMPORTANT

Each phase must be completed before the next phase can be carried out.
All phases must be completed before the aerial platform can be operated.

IMPORTANT

Always follow the instructions of the Calibration instrument.

IMPORTANT

Make sure the aerial platform is on BASE mode.

NOTE

To ensure a good and clear contact, clean the wire terminals before attaching the jumper clip.

3. Before starting the calibration you must put a jumper across the base speed resistor (See Figure for location of the resistor.)

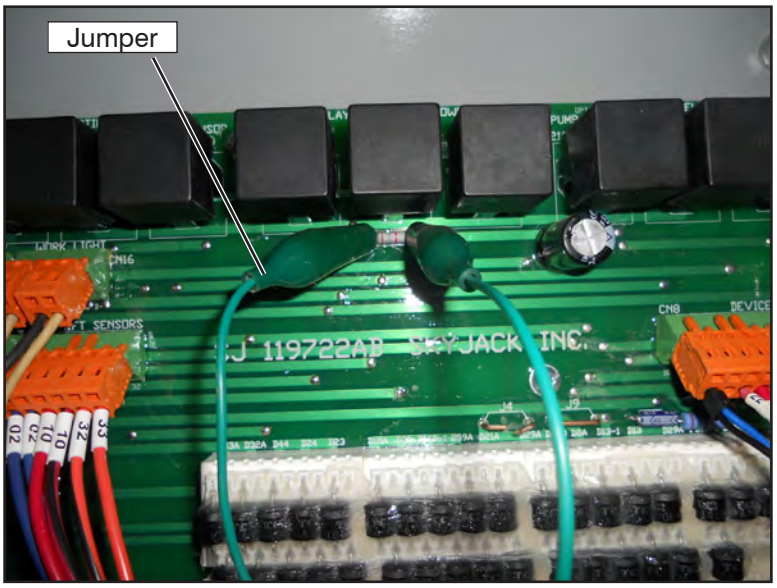

Figure 5-10. Main Circuit Board

4. Connect the Easy-Cal tool to the P1 connector on the CONTROL MODULE.

5. The display will show "**Help: Press Enter**".
By using Left/Right buttons, select the "Access Level (?)" from the menu and press the **ENTER** button.

Contact Skyjack Service Department at:
(44) 1691-676 236 for your Access Level Code Number.

6. The display will show "**Access Level Code (xxxx)**".
   By using the Up/Down buttons, enter the Access Level Code (xxxx) followed by pressing the **ENTER** button.

7. The display will show "**Access Level 2**".
   By using Left/Right buttons, select the "Setups" from the menu and press the **ENTER** button.

8. The display will show "**Machine Defaults**".
   Select the "Machine Defaults" from the menu and press the **ENTER** button.

9. The display will show "**Defaults, 0 = Custom**".
   By using Left/Right buttons, select the "**X = Group Code**" from the menu and press the **ENTER** button.

10. The display will show "**X=GROUP CODE**".
    By using the Up/Down buttons, enter the "Group Code (?)" then by using Left/Right buttons, select the "**Curve**" from the menu.

11. The display will show "**X=CURVE**".
    By using the Up/Down buttons, enter the "Curve Code (?)" followed by pressing the **ESCAPE** button.

12. The display will show "**Machine Defaults**".
    By using Left/Right buttons, select the "Tilt Setups" from the menu and press the **ENTER** button.

13. The display will show "**Tilt Setups: Calibrate Level**".
    Select the "**Tilt Setups: Calibrate Level**" from the menu and press the **ENTER** button.

14. The display will show "**Calibrate Level: Yes: Enter, No: ESC**".
    Select the "Yes" from the menu by press the **ENTER** button.

15. The display will show "**Calibrate Level: Tilt 0.0' , 0.0'**".
    Select the "**ESCAPE**" from the menu once.

16. The display will show "**Tilt Setups Calibrate Level**".
    Select the "**ESCAPE**" from the menu once again.

17. The display will show "**Setups Tilt Setups**".
    By using Left/Right buttons, select the "Load Setups" from the menu and press the **ENTER** button.

18. The display will show "**Load Setups: Calibrate Load**".
    Select the "**Load Setups: Calibrate Load**" from the menu and press the **ENTER** button.

19. At this point, elevate the aerial platform at full height, check the harness and making sure it is not stretched tight, then lower down the platform.

20. The display will show "**Calibrate Load: Platform Down?**".
    Asking for confirmation that the platform is fully lowered?
    Check that the platform is fully lowered then press the **ENTER** button to confirm.

21. The display will show "**Calibrate: Loaded Empty? No**".
    Asking for confirmation that the platform is empty?
    Check that the platform is empty

22. By using the Up/Down buttons, enter the "Yes" followed by pressing the **ENTER** button.

23. The display will show "**Calibrate Load: Please Lift.....**".
    Waiting for the lift switch to be activated.

24. Hold the lift switch and keep holding it until the platform is fully elevated.

IMPORTANT

If the lift switch is released earlier than full-height position, the calibration will have to be aborted and repeated from the beginning!

25. When the system detects the lift switch closed, the display will show "**Calibrate Load: Lift Empty**".

26. After a delay, the system will stop the platform lifting and will take height & pressure measurements; the display will show "**MEASURING # xx**" When the measurements have been taken, the platform will resume lifting.

NOTE

The Lifting.....stopping.....measuring....lifting process will continue until the platform reaches full height.

27. When the platform reaches full height release the lift switch.

28. The display will briefly show "**TOTAL DATA: 04**" to indicate the number of measurements taken.

29. The display will show "**Calibrate Load: Please Lower.....**".

IMPORTANT

If the lower switch is released earlier than full-lower position, the calibration will have to be aborted and repeated from the beginning!

30. Hold the lower switch and keep holding it until the platform is fully lowered.

31. When the system detects the lower switch closed, the display will show "**Calibrate Load: Lower Empty**"

32. After a delay, the system will stop the platform lowering and will take height & pressure measurements; the. display will show "**MEASURING #xx**". When the measurements have been taken, the platform will resume lowering.

NOTE

The lowering.....stopping.....measuring....lowering process will continue until the platform is fully lowered.

33. When the platform is fully lowered (and height 0% is displayed), release the lower switch.

34. The display will show briefly "**TOTAL DATA: 04**" to indicate the number of measurements taken.

35. The display will show "**Calibrate Load: Caldate: mm/dd/yy**".
    It is recommended that the current date be entered here to provide easy taking of the data of last calibration.
    The current date must be entered using the **LEFT**/**RIGHT** and **UP**/**DOWN** buttons.

36. Press ENTER to complete date entry (the system will store it).

37. The display will show "**Calibrate Load**" option.

38. Press the ESC button to exit the "**Calibrate Load**" option.

39. Remove the jumper wire and re-connect the black wire #14 to the coil removed earlier.

40. Close the hydraulic/electric tray.

NOTE

Continuing partially complete load calibration.

Once a calibration phase has been successfully completed, it is not required to do it again (unless of course a change to the vehicle such as a replacement sensor requires that calibration be repeated). This is useful if the calibration procedure is interrupted – the remaining phases can be completed at a later time.

If a calibration phase has been successfully completed, a "**REDO**" message is displayed:
REDO DYNAMIC: NO
REDO LOADED: NO
REDO EMPTY: NO

If the phase does not need to be repeated, just press **ENTER** to move on.
If the phase does need to be repeated, press **UP** or **DOWN** to change "**NO**" to "**YES**" then press **ENTER**.

5.5-6 Curve/Group Codes Chart

NOTE

Chart below is for models built effectively from January 1, 2010

MODEL	Number of Extension Decks	Curve Code	Group Code
7127	1 Manual Extension Deck	24	7
7127	1 Powered Extension Deck	25	7
7135	1 Manual Extension Deck	26	7
7135	1 Powered Extension Deck	27	7
8831	None	30	19
8831	1 Manual Extension Deck	31	19
8831	1 Powered Extension Deck	32	19
8831	2 Manual Extension Deck	33	19
8831	2 Powered Extension Deck	34	19
8831E	None	35	20
8831E	1 Manual Extension Deck	36	20
8831E	1 Powered Extension Deck	37	20
8831E	2 Manual Extension Deck	38	20
8831E	2 Powered Extension Deck	39	20
8841	None	40	17
8841	1 Manual Extension Deck	41	17
8841	1 Powered Extension Deck	42	17
8841	2 Manual Extension Deck	43	17
8841	2 Powered Extension Deck	44	17
8841E	None	45	18
8841E	1 Manual Extension Deck	46	18
8841E	1 Powered Extension Deck	47	18
8841E	2 Manual Extension Deck	48	18
8841E	2 Powered Extension Deck	49	18
9250	None	52	10
9250	1 Powered Extension Deck	53	10
9250	2 Powered Extension Deck	54	10
6832RT	1 Manual Extension Deck	56	15
6826RT	1 Manual Extension Deck	57	15
9241	2 Powered Extension Deck	58	15

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5.5-6 Curve/Group Codes Chart (Continued)

NOTE

Chart below is for models built prior to January 1, 2010

MODEL	Number of Extension Decks	Curve Code	Group Code
7127	1 Manual Extension Deck	24	7
7127	1 Powered Extension Deck	25	7
7135	1 Manual Extension Deck	26	7
7135	1 Powered Extension Deck	27	7
8243	1 Manual Extension Deck	28	7
8243	1 Powered Extension Deck	29	7
8831	None	30	9
8831	1 Manual Extension Deck	31	9
8831	1 Powered Extension Deck	32	9
8831	2 Manual Extension Deck	33	9
8831	2 Powered Extension Deck	34	9
8831E	None	35	13
8831E	1 Manual Extension Deck	36	13
8831E	1 Powered Extension Deck	37	13
8831E	2 Manual Extension Deck	38	13
8831E	2 Powered Extension Deck	39	13
8841	None	40	10
8841	1 Manual Extension Deck	41	10
8841	1 Powered Extension Deck	42	10
8841	2 Manual Extension Deck	43	10
8841	2 Powered Extension Deck	44	10
8841E	None	45	14
8841E	1 Manual Extension Deck	46	14
8841E	1 Powered Extension Deck	47	14
8841E	2 Manual Extension Deck	48	14
8841E	2 Powered Extension Deck	49	14
8850	1 Manual Extension Deck	50	7
8850	1 Powered Extension Deck	51	7
9250	None	52	10
9250	1 Powered Extension Deck	53	10
9250	2 Powered Extension Deck	54	10
6832RT	1 Manual Extension Deck	56	15
6826RT	1 Manual Extension Deck	57	15
9241	2 Powered Extension Deck	58	15

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